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FLORA OF PERU

BY

J. FRANCIS MACBRIDE

CURATOR, PERUVIAN BOTANY

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BOTANICAL SERIES
FIELD MUSEUM OF NATURAL HISTORY
VOLUME XIII, PART V, NUMBER 2
DECEMBER 9, 1960

PUBLICATION 902

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FLORA OF PERU

J. Francis Macbride

BORAGINACEAE [Juss.] Lindl.

Various in habit, ligneous or herbaceous, usually pubescent, not infrequently harshly, the perfect normally 5-merous flowers ordinarily in open and branched or scorpoid inflorescences, rarely solitary. Calyx never entire, the lobes sometimes uneven. Corolla usually regular, often plaited, pubescent or, in the throat, somewhat appendaged. Stamens on the tube and alternate with the lobes. Ovary superior, bicarpellate, the commonly biovulate carpels free or united, each remaining entire, parting along a medial false partition or more or less lobed or separated along the medial line of the partition. Fruit dry to fleshy in some degree, retaining the composition of the carpels or, and generally, becoming 2–4 biovulate or uniovulate nutlets. Style obsolete to well-developed, simple, bilobed or twice forked, variously situated, sometimes on an upwardly extended receptacle (gynobase); stigma entire or slightly bilobed.

The numerous papers of I. M. Johnston—the outstanding student of the family—are cited with comment under the genera concerned; the usefulness of this synopsis stems, of course, from his realistic and thoughtful studies. The cytogenetic studies on the family by Donald M. Britton, Brittonia 7: 233–266. 1951, will probably help to an understanding of relationship.

Forget-me-not is probably the best known plant in this family, certainly one of the most beloved in gardens nearly everywhere. Otherwise the group is more interesting to taxonomists than to horticulturists; however, *Echium*, *Heliotropium* and *Cordia* are often grown for ornament while a few have popular medicinal repute, notably borrago (*Borago officinalis* L.).

Regretfully I here record the passing of my never-to-be-forgotten friend, Ivan Johnston.

Ovary slightly lobed if at all, sometimes 2–4-grooved laterally.

Style entire, stigma 1; inflorescences or its branches scorpoid or its flowers solitary.

Clambering shrubs (or, as *T. microcalyx*, erect); fruit pulp aqueous, mesocarp fleshy, nutlets 2–4, bony. . . . 1. *Tournefortia*.

Herbs or suffrutescent; fruit dry, parting into 2–4 bony nutlets. 2. *Heliotropium.*

Style 2-parted or early coherent; much-branched prostrate herbs or ligneous below.....3. *Coldenia.*

Style twice forked, stigmas 4; inflorescence not scorpoid; fruit drupaceous except *C. alliodora.*

Flowers sessile, not in foliose panicles; calyx not inflated. 4. *Cordia.*

Flowers pedicellate in foliose panicles; calyx soon dilated. 5. *Saccellium.*

Ovary deeply 4-parted, the fruit consisting of 4 (or fewer) nutlets.

Nutlets neither margined nor appendaged.

Corolla lobes contorted in bud; "no-me-olvides"...6. *Myosotis.*

Corolla lobes imbricate in bud.

Flowers ebracteate; leaves crowded toward stout perennial base.....7. *Moritzia.*

Flowers often bracted or plants annual.

Leaves all alternate; perennials.....8. *Lithospermum.*

Leaves, at least lower, opposite or in a rosette; annuals or biennials.

Corolla yellow, throat usually smooth....9. *Amsinckia.*

Corolla white at least in large part, throat appendaged.

Nutlets keeled ventrally (or also dorsally).

Leaves mostly in a basal rosette..10. *Plagiobothrys.*

Lower leaves opposite, even the earliest. 11. *Allocarya.*

Nutlets grooved ventrally, keeled obscurely if at all dorsally.....12. *Cryptantha.*

Nutlets alate-margined or dorsally appendaged.

Appendages apically barbed; leaves alternate....13. *Hackelia.*

Appendages or teeth apically uncinate-setose; first leaves opposite.....14. *Pectocarya.*

1. TOURNEFORTIA L.

Reference: Johnston, Contr. Gray Herb. 92: 66–68. 1930.

Lianas or shrubby and then often lax or subscandent, the flowers in scorpoid racemes or spikes disposed in dichotomous panicles.

Calyx persistent. Corolla limb spreading. Ovary 4-celled; style (or stigma) terminal, simple, the stigma peltate or conic, usually bifid at tip, often sessile. Fruit fleshy, obscurely if at all lobed or definitely consisting of 1–2-seeded irregular nutlets or of 4 consimilar 1-seeded nutlets; nutlets often with 1–2 empty cavities. Embryo straight or curved.

The scholarly paper of Johnston, while entitled "Treatment of *Tournefortia*," actually concerns only the species of the eastern half of South America; he divided the genus into section *Eutournefortia* Johnst., the obscurely or not lobed fruit bicarpellate, composed of 1–2-seeded uneven (often joined) nutlets, the embryo straight, and section *Cyphocyema* Johnst., the evidently lobed fruit obscurely bicarpellate, consisting of 4 similar 1-seeded nutlets, the embryo curved and the corolla lobes very narrow with involute margins. This clarification of the genus is a fine contribution to its taxonomy; most Peruvian species belong to the latter section (some are incompletely known); at least *T. bicolor* Sw., *T. cuspidata* HBK., *T. hirsutissima* L., *T. ovalifolia* Rusby and *T. Ulei* Vaupel belong to the former. The following key attempts to lead to herbarium materials often only in flower; no doubt several names refer more correctly to variants.

Corolla segments more or less setiform, distinctly longer than wide, often recurving at tip; calyx segments minute or narrow.

Corolla about 1 cm. long; leaves usually rounded at base; inflorescences ordinarily terminal..... *T. maculata.*

Corolla to about 5 mm. long; leaves somewhat acute at base; inflorescences axillary, often also terminal.

Stems as leaves beneath strigose tomentose..... *T. mapirensis.*

Stems as leaves green or lightly appressed strigose.

Leaves merely acute at base.... *T. breviflora, T. psilostachya.*

Leaves decurrent at base..... *T. glabra.*

Corolla segments rounded to acute, sometimes narrowed above but not distinctly longer than wide; calyx segments about 1.5 mm. long or longer, or broad.

Leaves more or less bicolored, tomentose beneath, usually green and sparsely (rarely densely) strigose above.. *T. polystachya.*

Leaves concolor, pubescence subequally developed both sides.

Corolla tube 2.5–3 mm. long; calyx minute; leaves oblong-lanceolate to elliptic, rarely 3.5 cm. long.... *T. microcalyx.*

Corolla tube about 4–12 mm. long; calyx and leaves mostly larger.

Inflorescence lax, branchlets even in flower divaricate, some soon several cm. long or if early suberect or short, corollas about 1 cm. long.

Corollas about 5 mm. long, rather in corymbs; style well-developed (unless *T. glabra*).

Flowers sessile; leaves ample, usually drying dark. *T. Ulei, T. glabra.*

Flowers pedicellate; leaves drying brownish-green.

Calyx hispidulous; stems scabrous..... *T. ovalifolia.*

Calyx glabrate; stems scurfy..... *T. chinchensis.*

Corollas 10–12 mm. long, mostly on dichotomous branches; style short.

Leaves ample, drying black, glabrous.... *T angustiflora.*

Leaves rather small, greenish-brown, puberulent. *T. tarmensis, T. Buchtienii.*

Inflorescence dense, branchlets even in age rarely 3 cm. long unless *T. hirsutissima, T. undulata,* especially if corolla is long, this usually 5–7 mm. long.

Stems notably spreading hirsute, trichomes long; corolla about 1 cm. long..... *T. cuspidata.*

Stems usually densely, leaves evenly more or less appressed hispid; corolla densely strigose, shorter. *T. hirsutissima.*

Stems glabrous or puberulent as leaves or these rather obscurely pubescent on nerves and veins.

Upper stems and inflorescence closely reddish puberulent. *T. tarmensis, T. Buchtienii.*

Upper stems glabrous or glabrate, indument if present sparse.

Leaf nerves, at least mostly, about 1 cm. distant; petioles about 1 cm. long.

Leaves about twice as long as wide.

Leaves membranous..... *T. setacea, T. bicolor.*

Leaves coriaceous..... *T. coriacea.*

Leaves about three times longer than wide. *T. longifolia.*

Leaf nerves, at least mostly, about 5 mm. distant.
Leaves long-decurrent, about three times longer than wide..... *T. ternifolia.*
Leaves short-decurrent, or subsessile, about two times longer than wide.. *T. virgata, T. undulata.*

Tournefortia angustiflora R. & P. Fl. Peruv. 2: 25, *pl. 151a.* 1799.

Spreading, branching, glabrous or nearly, the larger subherbaceous glabrous branches about 8 mm. in diameter with ovate-acuminate leaves to 2 dm. long, 8 cm. wide, those of the flowering branchlets half as large or smaller, narrowly acuminate, minutely hispidulous both sides; inflorescence branches often arcuate-divaricate; calyx sessile, scarcely 1 mm. long, lobes ovate, subacute; corolla greenish or yellowish-white, sparsely and obscurely puberulent, the slender tube 1 cm. long, the lobes subrotund, about 5–6 mm. across expanded; fruit white, succulent, glabrous, 5–6 mm. in diameter.—F.M. Neg. 1038.

Huánuco: Chicoplaya and Pueblo Nuevo, *Ruiz & Pavón,* type. Pozuzo, *4644.* Prov. Huamalies, *Weberbauer 3637* (det. Vaupel).—Loreto: Yurimaguas, *Killip & Smith 28064* (det. Killip).—Río Acre: Seringal Auristella, *Ule 9708.* Ecuador.

Tournefortia bicolor Swartz, Prodr. 40. 1788. *T. laevigata* Lam. Tab. Encycl. 1: 416. 1791, fide Johnston, Journ. Arnold Arb. 16: 51. 1935.

To several meters tall, finally more or less scandent, its branchlets glabrate or sparsely appressed pubescent with antrorse trichomes; petioles 0.5–1.5 cm. long; leaves ovate to elliptic or somewhat lanceolate, obtuse-rounded at base, acute, 0.5–1.5 dm. long, 1.3–9 cm. wide, slightly lustrous, dark green, often obscurely papillate and pubescent with fragile appressed trichomes, these more abundant beneath; inflorescence often ample, finally lax but the racemes early crowded, 1–4 cm. long; calyx sparsely strigose, usually sessile, lobes at anthesis usually 1–2.5 mm. long, little accrescent; corolla strigose, tube 4–5 mm. long, limb 6 or 7 mm. across; fruit white, succulent, glabrous, elobate; stigmas subsessile.—Calyx lobes subfiliform, sometimes 5 mm. long; pubescence nearly lacking or more abundant (var. *calycosa* Donn. Smith, Bot. Gaz. 14: 27. 1889). Common, especially near Iquitos, only a few collections cited.

San Martín: San Roque, *Williams 7783* (det. Killip).—Junín: La Merced, *Killip & Smith 23515* (det. Killip).—Loreto: Near

Mazán, *Mexia 6455* (det. Johnston); *José Schunke 121; 270* (det. Killip). Yurimaguas, *Williams 4237, 4241* (det. Standley); *Klug 2809* (det. Killip). Near Iquitos, *Klug 735; Killip & Smith 27413; Williams 1395; 3571.* Yarina Cocha, *Tessmann 5425.* Florida, *Klug 1999.* American tropics. "Loblobó" (Mexia).

Tournefortia breviflora DC. Prodr. 9: 520. 1845; 76. *T. xapuryensis* Vaupel, Notizbl. Bot. Gart. Berlin: 186. 1914?

Resembles *T. mapirensis* but green, obscurely if at all strigose, and the slender divaricately branched inflorescence usually entirely axillary (or also terminal); stems as petioles somewhat puberulent, the latter 1–1.5 cm. long; leaves oblong-elliptic, acute at base, rather abruptly acuminate, to about 1 dm. long, 4 cm. wide, the slender distant nerves prominent only beneath; inflorescence lax, 5–8 cm. long, sometimes with a linear bract or two; calyx about 0.5 mm. long, the puberulent-ciliate lobes lanceolate, acute; corolla 3–4 mm. long, greenish-yellow, obscurely puberulent, the lobes subulate-subsetiform (Vaupel).—DeCandolle's plant, ex char., may be distinct; his diagnosis differs in petioles 6 mm. long, leaves about 6 cm. long, 2 cm. wide, corolla 3 mm. long, the short lobes acute. However, the Vaupel plant probably occurs in Peru like the related *T. mapirensis* with in part similar range; both species seem to be scarcely separable from *T. psilostachya* HBK.—F.M. Neg. 1065.

Río Acre: Seringal San Francisco, *Ule 9710* (type, *T. xapuryensis*). Brazil; Paraguay.

Tournefortia Buchtienii Killip, Journ. Wash. Acad. Sci. 17: 334. 1927.

Branches subterete, ferrugineous-tomentose and scabroid; petioles opposite, to 2 cm. long; leaves oblong or oblong-elliptic, rounded or subacute at base, acuminate, 7–14 cm. long, 3–5 cm. wide, the 10 or so lateral nerves slightly impressed above, where dark green and appressed strigillose except the nerves, rusty hirsutulous especially beneath; peduncles 6–7 cm. long, subternately branched, the branchlets 2–3-dichotomous, the subterminal flowers 2.5 mm. distant; sepals linear, 2–3 mm. long; corolla tube 7–10 mm. long, dilated just below throat, rusty tomentose, the orbicular lobes minute; stamens near throat, linear; style about 7 mm. long; fruit ovoid-conical, 7–8 mm. long, glabrescent, white.—After author, who indicated no relationship. Leaves of Weberbauer specimen are oblong-elliptic,

to 5 cm. long, 12 mm. wide, while *Eyerdam 25123* from La Paz has leaves to 1.5 dm. long, 5 cm. wide.

Junín: Comas, 3,300 meters, *Weberbauer 6607* (det. Killip, 1937, *T. ovalifolia;* 1925, *T. chinchensis*). Bolivia.

Tournefortia chinchensis Killip, Journ. Wash. Acad. Sci. 17: 331. 1927.

Branches soon terete, scurfy, ferrugineous-hirsutulous; petioles 5–10 mm. long; leaves opposite, ovate-oblong to narrowly oblong, 3–7 cm. long, about 1–3 cm. wide, slightly narrowed at base, acute, entire, the 6 or 7 nerves impressed above, prominent beneath, subcoriaceous, glabrous or slightly hispidulous above, glabrous beneath except for the rusty hirsutulous nerves and veins; inflorescence 3–4-dichotomous, the ultimate branches 2–3 cm. long in flower, the flowers about 2 mm. apart; sepals linear, 2–3 mm. long, glabrous or a little pilosulous; corolla tube 6–9 mm. long, rusty tomentose, greenish, the minute orbicular but apiculate lobes glabrous; stamens 1–1.5 mm. long, style 5 mm. long; fruit depressed globose, about 8 mm. in diameter, white, glabrescent.—After Killip, who contrasted two similar species (*T. andina* Britton, *T. ovalifolia* Rusby) as follows:

Flowers sessile; corolla tube appressed hirsute; branchlets smooth. *T. andina.*

Flowers pedicellate; corolla tube tomentose; branchlets rough.

Calyx lobes 2 mm. long or less; leaves alternate..... *T. ovalifolia.*

Calyx lobes longer than 2 mm.; leaves subopposite. *T. chinchensis.*

However, Johnston included the shrub in *T. ovalifolia* Rusby. Ecuadorian specimens by Steyermark, apparently the same, have leaves 8 cm. long, 3.5 cm. wide.

Huánuco: Hacienda Villcabamba, Río Chinchao, *5142* (type, *T. chinchensis*). Bolivia, Ecuador.

Tournefortia coriacea Vaup. Bot. Jahrb. 54, Beibl. 119: 3. 1916.

Shrubby, the stout branches smooth; petioles 2 cm. long; leaves oval or broadly elliptic, short-acuminate, ample, coriaceous, glabrous; inflorescence small with few branches; flowers about 5 mm. long; calyx lobes narrowly lanceolate; corolla tube about two times longer than the calyx, sparsely pilosulous with minute appressed trichomes, the lobes obtuse; anthers affixed at base of tube, narrowly lanceolate; pistil shorter than calyx, stigma conical.—After the author, who

merely remarked: at once recognizable by the large leathery leaves. The Williams specimen has petioles 1 cm. long, leaves to 12 cm. long, 8 cm. wide, nerves 1 cm. apart, lightly impressed above; calyx lobes subulate, 2 mm. long, corolla puberulent, tube 7 mm. long, lobes rounded, 1 mm. long. F.M. Neg. 1042.

Loreto: Yurimaguas, *Williams 7839* (det. Killip). Ecuador.

Tournefortia cuspidata HBK. Nov. Gen. & Sp. 3: 83. 1818. *T. obscura* A. DC. Prodr. 9: 517. 1845, fide Johnston, Journ. Arnold Arb. 16: 54. 1935.

Shrub or liana, the branchlets short-pubescent and inordinately villous-hirsute with slender spreading brown trichomes some 4 mm. long; petioles to about 1 cm. long or somewhat longer; leaves lanceolate to subovate, rounded or obtuse at base, acuminate, 7–15 cm. long, 3–6 cm. wide, closely appressed strigose; spikes approximate at ends of elongate branches, to 3 cm. long; calyx lobes subulate-linear, 7–9 mm. long, little longer in fruit, sparsely long-pubescent and short-strigose; corolla tube 5–8 mm. long, densely strigose, limb 4–6 mm. across; fruit white, fleshy, somewhat verruculose; stigma sessile.—Common on the lower Río Huallaga, only a few collections cited.

San Martín: Juanjuí, *Klug 3776*.—Loreto: Yurimaguas, *Williams 3845; 4312; 4776; 4972; 7870*. Yarina, *Tessmann 3773*. Near Iquitos, *Klug 432*. Bolivia to Central America and the West Indies.

Tournefortia glabra L. Sp. Pl. 141. 1753.

Large scandent or erect shrub or small tree; branchlets puberulent or glabrate; leaves lanceolate-elliptic to ovate, 0.5–1.5 dm. long, narrowed to both ends and often long-decurrent on the slender petioles, membranous, early pilosulous, at maturity nearly glabrous; spikes frequently many, slender, sometimes greatly elongate, the inflorescence lax; calyx lobes lanceolate, about 2 mm. long, long-acuminate as the lobes of the pale green or whitish corolla, its tube 4 mm. long; fruits white, succulent, to about 5 mm. thick, 9 mm. long, not lobed.—Wood bright yellow when cut.

San Martín: Pongo de Cainarachi, *Klug 2730* (det. Killip). To Mexico; West Indies.

Tournefortia hirsutissima L. Sp. Pl. 140. 1753. *Messerschmidtia hirsutissima* (L.) Roem. & Schult. Syst. 4: 541. 1819.

Branches subtetragonous, typically densely (not in Peru as determined) short-hirsute as the petioles and peduncles; petioles stout, 6–9 mm. long or much longer; leaves ovate-oblong or -elliptic, usually acuminate, rounded to narrowed at base, mostly 6–9 cm. long, about 5 cm. wide to twice as large, membranous, appressed strigose beneath, scabrous or more sparsely hispid above; inflorescence usually ample, corymbose or dichotomously divided; spikes dense, narrow, in fruit 3–4 cm. long; calyx hirsute or hispidulous, the calyx teeth linear to ovate-oblong, acute or acuminate; anthers linear, at middle of tube; corolla white, at least the tube sericeous, 4–6 mm. long, the lobes acute or apiculate; style very stout, stigma depressed-conical; fruit globose, white, hispidulous, about 5 mm. in diameter; nutlets 4, ovate-oblong.—Shrubby or a liana to several meters long; the indument is sometimes so short that it is inconspicuous; Killip determinations.

San Martín: Juanjuí, *Klug 4321*. Tarapoto, *Williams 5781; 5690; 6629*.—Huánuco: Puente Durand, 1,900 meters, *Weberbauer 9590*. Widely distributed in tropical America.

Tournefortia longifolia R. & P. Fl. Peruv. 2: 25, *pl. 150b*. 1799.

Glabrous or nearly, erect, the branches sulcate-angled; petioles about 1 cm. long; leaves oblong-lanceolate or -elliptic, acute both ends or acuminate, to 2 dm. long, 6–7 cm. wide, submembranous but somewhat rugose-bullate above in age, much veined; inflorescence dichotomous but small, few-flowered; seeds trigonous.—Type in fruit, imperfectly known. F.M. Negs. 12943; 29254.

Huánuco: Pozuzo, *Ruiz & Pavón*, type.

Tournefortia maculata Jacq. Enum. 14. 1760; Sel. Stirp. 47. 1763. *T. syringaefolia* Vahl, Symb. 3: 23. 1794. *T. peruviana* Poir. Encycl. Suppl. 4: 425. 1816. *T. volubilis* L. as to R. & P. Fl. Peruv. 2: 24, *pl. 148b*. 1799, fide Urban and Johnston. *T. paniculata* Cham. Linnaea 4: 468. 1829?

Shrubby or sometimes more or less clambering or climbing, dark green and inconspicuously short-strigose or leaves softly pilosulous beneath, including the lax inflorescence and growing parts; petioles about 1–1.5 cm. long, leaves ovate or somewhat elliptic-lanceolate, acute to rounded at base, acuminate, mostly 5–10 cm. long, 3–5 cm. wide, ordinarily densely and finely tuberculate; calyx 1–1.5 mm. long, scarcely accrescent but pedicels finally 1–5 mm. long and thickening; corolla greenish-white, tube 3–4 (–8) mm. long, limb 3–5 mm. across;

fruit yellow, often blotched with black, the 4 finally separate nutlets rounded dorsally, angled ventrally.—Johnston, Journ. Arnold Arb. 30: 130. 1949, identified the plant of Jacquin. F.M. Neg. 1054 (*T. volubilis*).

San Martín: Tarapoto, *Williams 5414; 6170* (det. Killip). Zepelacio, *Klug 3348*.—Huánuco: Pozuzo, *Ruiz & Pavón* (type, *T. volubilis*).—Junín: La Merced, *5473*.—Loreto: Yurimaguas, *Williams 4778; 4971; 4973; 5121*. Nanta, *Raimondi 9427*.—Cuzco: Valle de Santa Ana, *Herrera 2632*.—Puno: *Gay* (as *T. volubilis*). To Central America and the West Indies; Brazil.

Tournefortia mapirensis Lingelsheim, Repert. Nov. Sp. 7: 244. 1909; 76. *T. subrotunda* Rusby, Bull. N. Y. Bot. Gard. 8: 115. 1912, fide Johnston.

Fulvous strigose-tomentose liana (except leaves above) with axillary (and terminal) leafless lax inflorescences; petioles 1–2 cm. long; leaves broadly ovate, subcordate or rounded at base, shortly acuminate, (4) 8–12 cm. long, (2.5) 4.5–8 cm. wide, dark green but lightly pubescent above, paler and densely strigose-tomentose beneath, the nerves 5 or 6 pairs; calyx 2 mm. long, accrescent in fruit; corolla greenish-yellow, scented, the tube very narrow, pubescent, 4 mm. long, the subsetiform acute segments 1 mm. long; fruits early yellow, subglobose, 4 mm. thick, finally purple to black-brown.—Mostly after author; very distinct by its tawny pubescence, definitely axillary inflorescences, the flowering branchlets leafless or the few leaves much reduced, according to Johnston, who determined the Peruvian specimen. Inflorescences 4–6 cm. broad, branches 1.5–2.5 cm. long (Rusby).

Loreto: Yurimaguas, (*Spruce 3889*).—Río Acre: Seringal San Francisco, *Ule 9712; 9713*. Bolivia to Amazonian Brazil.

Tournefortia microcalyx (R. & P.) Johnst. Journ. Arnold Arb. 37: 295. 1956. *Heliotropium microcalyx* R. & P. Fl. Peruv. 2: 3, *pl. 109b*. 1799. *Tournefortia hispidula* R. & P., in herb.

Open, often stockily branched, a meter or two tall, glabrous or essentially or the oblong-lanceolate leaves beneath and almost tiny flowers minutely hispidulous; leaves oblong-lanceolate, attenuate to the slender petioles, these 5–8 mm. long, moderately acuminate, 5–10 cm. long, 1–3.5 cm. wide, membranous, obscurely venose above, lightly reticulate-veined beneath; inflorescence axillary, usually about 3–5 mm. in overall size, the branchlets often arcuate-spreading;

calyx segments sublinear, scarcely 1.5 mm. long, not accrescent in fruit, usually glabrate as the nearly twice as long corolla, this with rounded lobes, expanded about 2.5 mm. across, white; fruit composed of 4 similar nutlets.—Shrub but open and with short or longer and floppy branchlets, white translucent fruit. Determinations by Killip. F.M. Negs. 1048 (*T. hispidula*); 1051.

Piura: Cerro Viento, *Haught 95*.—Ancash: Tambo de Pariocota, *2550*.—Lima: Pachacamac, *Mexia 8096; 8333*. Lurín, *Pennell 12205*. Atocongo, *Pennell 14758*. Prov. Huarochiri, *Weberbauer 5250*. Near Lima, *Neé; Gaudichaud*. Chosica, *Grant 7401*.—Huánuco: Chicoplaya, *Isern 2080*. Chinchao, *Ruiz & Pavón* (type, *T. hispidula*). Hills of Huánuco, *Ruiz & Pavón*, type.

Tournefortia ovalifolia Rusby, Bull. N. Y. Bot. Gard. 4: 414. 1907.

Branchlets sparsely scabrous; petioles about 1 cm. long, broadly sulcate; leaves oval, slightly decurrent at base, abruptly and acutely cuspidate, 6–10 cm. long, 3–6 cm. wide, dark green, the 10–12 pairs of lateral nerves prominent only beneath where yellowish or purplish; peduncles 2–3 cm. long, the branches of the dichotomous inflorescence elongating, flowers 2–3 mm. distant; pedicels 2–3 mm. long; calyx 2 mm. long, truncate at base, the lanceolate lobes erect; corolla tube 5 mm. long, lobes rounded; style 3 mm. long, stigma 1 mm.; fruit globose-ovoid.—Flowers green. Perhaps should be interpreted to include *T. chinchensis* Killip.

Peru (cf. note above). Bolivia.

Tournefortia polystachya R. & P. Fl. Peruv. 2: 24, *pl. 149, fig. a*. 1799. *Heliotropium oppositifolium* R. & P. l.c. 2: *pl. 108, fig. b*. *T. loxensis* HBK. Nov. Gen. & Sp. 3: 81. 1818, at least as to Peru.

An open shrub or tree-like in age, the flowering branchlets puberulent, the ample open terminal inflorescences as the leaves beneath fulvous-canescent villous; petioles about a fourth as long as leaves, these, at least the lower, somewhat obliquely rounded to subcordate at base, shortly acuminate, commonly ovate or the upper sometimes somewhat elliptic and narrowed to base, those of the flowering branches 6–15 cm. long, usually about 4–6 cm. wide, but attaining 2.5 by 2 dm., slightly scabrous, glabrate and finally bullate above; calyx segments sublinear, 2 mm. long, not accrescent; corolla tube about 4–5 mm. long, lobes rotund; fruit with white translucent pulp at least 1 cm. in diameter.—The flowers, at first greenish-yellowish,

are white when fully expanded and 5 mm. across, either with a disagreeable odor (*2404*) or fragrant (*4017, 4188;* and *Stork & Horton*); unnoted determinations by Killip. Type of *H. oppositifolium* R. & P. had hispid stems and leaves asperous above but seems to belong here. F.M. Negs. 1056; 27094 (*Mathews*); 1052 (*T. oppositifolia*).

Cajamarca: Below Ocros, *Weberbauer 2716; 2716a.*—Amazonas: Chachapoyas, *Mathews.*—La Libertad: Cachicadan, *Stork & Horton 9953* (det. Standley, *Heliotropium arborescens*).—Lima: Ambar, *Stork 11433.*—Huánuco: Chaglla, *Weberbauer 6706.* Huánuco, *2404; 3098; Sawada 82.* Muña, *4017; 4188; Ruiz & Pavón* (type, *H. oppositifolium*). Mito, *3377.* Piedras Grandes, *Woytkowski 127.*—Junín: Near Tarma, Huassa-huassi, *Ruiz & Pavón,* type.—Cuzco: Marcapata Valley, *Weberbauer 7877* (det. Standley). To Colombia. "Antagra" (Ruiz & Pavón).

Tournefortia psilostachya HBK. Nov. Gen. & Sp. 3: 78. 1818. *T. floribunda* HBK. l.c. 79, at least as to Peru. *T. cirrhosa* Vaupel, Bot. Jahrb. 54, Beibl. 119: 3. 1916. *T. volubilis* L. Sp. Pl. 140. 1753, at least in lit.

Variable in leaf size, form and indument but as interpreted usually more or less appressed strigillose, especially the younger branchlets and leaves beneath; petioles a few mm. to 1 cm. long; leaves rather oblong or narrowly ovate-lanceolate to broadly ovate, obliquely rounded at acute base, acuminate, sometimes abruptly, usually 5–8 cm. long, about 1.5–2.5 cm. wide or the lower larger; peduncles in type terminal, the filiform spikes diffuse; calyx strigose, the lanceolate acuminate segments spreading; corolla long-exserted, sericeous, the throat inflated, the lobes subulate; anthers subsessile near top of tube, this as long as the filiform style; stigma small, subconic.—*T. floribunda* HBK. ex char., type from Colombia, has leaves obtuse or rounded at base, somewhat canescent sericeous beneath, corolla tube about 3 mm. long, the lobes "short"; Johnston, Contr. Gray Herb. 92: 88. 1930, suggested that it once may have had a continuous range to eastern Brazil; however, the single Peruvian collection referred to it is more probably a form of *T. psilostachya,* which name, long in use, is here retained in preference to the perhaps not identical one of Linnaeus. Finally, Vaupel's plant, type from Ecuador, has ovate leaves 4–5 cm. wide and may be distinguishable; cf. *T. breviflora.* Determinations by Killip. F.M. Negs. 38975; 1043 (*T. cirrhosa*).

Loreto: Mishuyacu, near Iquitos, *Klug 1113; 1213.* Nanchó, (*Raimondi 3414*, det. Herb. Dahlem, *T. floribunda*).—Puno: *Gay.* Ecuador; northern South America?

Tournefortia setacea Killip, Journ. Wash. Acad. Sci. 17: 332. 1927.

A bushy-branched liana, the younger branches, leaves above and beneath on the nerves appressed strigillose; petioles 0.5–2 cm. long; leaves subopposite or in threes, oblanceolate or ovate, 5–14 cm. long, 3–7.5 cm. wide, subdecurrent, acuminate, entire, membranous, dark green above, paler beneath; inflorescence to about 7 cm. wide, few-branched, shortly peduncled; flowers sessile; sepals linear-setaceous, 4–5 mm. long, about as long as the strigillose corolla tube, the suborbicular corolla-lobes 1.5 mm. long; stamens near base of tube, anthers linear, 2.5 mm. long; fruit conical, 3–4 mm. long, strigillose, white.—With the variation that Johnston assigned to *T. bicolor* Sw. to which Killip originally referred it; this may not be distinct, but the author wrote: "the long setaceous sepals distinguish it."

San Martín: Sinchona, *Ferreyra 1127.*—Huánuco: Cushi, *4829.* Río Pozuzo, *Weberbauer 6737.*—Junín: La Merced, *5579*, type. Colonia Perené, *Killip & Smith 24993.*—Ayacucho: Aina, *Killip & Smith 22733.* Estrella near Huanta, *Killip & Smith 22668.*—Cuzco: Cerro Mascac, Valle de Lares, (*Herrera 1779*). Bolivia.

Tournefortia tarmensis (Krause) Macbr., comb. nov. *Heliotropium tarmense* Krause, Bot. Jahrb. 37: 632. 1906.

Liana or the branches clambering, these glabrous in age, early quadrate, sparsely as leaves both sides, reddish-pilosulous; petioles 4–6 mm. long; leaves oblong- or ovate-elliptic, shortly or subacute both ends, 3–6 cm. long, 1–3 cm. wide, often somewhat undulate, nearly smooth; spikes at first corymbosely congested, rather lax in full flower, 2–5 cm. long; flower limb 7 mm. long; calyx lobes linear, hispidulous, scarcely 2 mm. long; corolla tube greenish, puberulent only without, the crisped spreading lobes white; anthers linear, acute, subsessile; style elongate.—Distinguished by Krause from *T. microcalyx* (R. & P.) Johnst. especially by the much longer flowers. F.M. Neg. 1062.

Junín: Comas, *Weberbauer 6607*, in part? (det. Killip, *T. ovalifolia*). Palca, Prov. Tarma, *Weberbauer 1750*, type. Carpapata, Prov. Tarma, *Soukup 3440.* Bolivia.

Tournefortia ternifolia HBK. Nov. Gen. & Sp. 3: 84. 1818.

Branches terete, sparsely appressed pubescent; petioles 1.5–2 cm. long; leaves ternate, oblong, narrowed to both ends, acute, about 1.5 dm. long, half as wide, membranous, reticulate-veined, glabrous or appressed pubescent on nerves beneath; spikes terminal, geminate, peduncled, less than 2.5 cm. long; flowers pedicellate, secund, ebracteate; calyx strigose, teeth linear-lanceolate; corolla strigose, thrice as long as calyx (after authors).—Compare *T. longifolia* R. & P. to which the Killip and Smith collection, young, may belong, or possibly there is only one species.

Cajamarca: Tomependa, *Bonpland*, type.—Amazonas: Chachapoyas, *Mathews 3009* (det. Killip).—Junín: Tarma, *Killip & Smith 21920* (det. Killip).

Tournefortia Ulei Vaupel, Notizbl. Bot. Gart. Berlin 6: 186. 1914.

Scandent, the younger branchlets sparsely puberulent; petioles 1 cm. long or longer; leaves broadly elliptic or ovate, shortly acuminate, to 13 cm. long, 7 cm. wide, glabrous; inflorescence to 2.5 dm. long, lax, mostly trichotomous with divaricate branches, with sessile leaves above the first branches; flowers subsessile, crowded, appressed puberulent; calyx lobes narrowly triangular, 1–2 mm. long, 3–4 times shorter than corolla tube, this 6 mm. long, slightly inflated, densely yellowish-brown pubescent; flowers yellow-green, about 7 mm. long; anthers below throat; style nearly as long as tube, stigma conical; fruit glabrous, ovoid, often crowned with pistil (after author).—*T. andina* Britton, Bull. Torrey Club 26: 148. 1899, of Bolivia with sessile flowers may be comparable. The Peruvian specimen has glabrate flowers and no leaves in the inflorescence; compare *T. glabra* L.

Loreto: Florida, mouth of Río Zubineta, *Klug 2083* (det. Standley). Amazon headwaters (Río Madeira).

Tournefortia undulata R. & P. Fl. Peruv. 2: 25, *pl. 149b*. 1799.

Rounded shrub or tree-like, to 3 meters tall, the branchlet tips and young inflorescences reddish pilose, soon glabrous or nearly; flowering branches densely leafy, stout; leaves broadest at or slightly above the middle, attenuate into the short sulcate petioles, rather abruptly acuminate, usually 8–15 cm. long, 3–6 (8) cm. wide, coriaceous, the many arcuate-ascending lateral nerves rather obscure above, prominent with veins beneath, mostly 5–7 mm. distant,

rugose-bullate in age above; inflorescences and branches densely flowered, suberect, tardily spreading, to 7 cm. long or usually shorter; calyx segments subulate, about 3 mm. long, to 4 mm. long in fruit; corolla tube puberulent, 4 mm. long, lobes subrotund, about 1 mm. long; fruit not lobed, white, about 5 mm. in diameter, style apparently obsolete.—*Killip & Smith 21525* from the botanical garden at Lima was about 3 meters high in 1929. F.M. Neg. 1064.

Huánuco: Mito, *1998*. Pillao, *Ruiz & Pavón*, type.—Arequipa: Near Chala, *Worth & Morrison 15685*. Atiquipa, 1,050 meters, *Tafalla*, type; *Weberbauer 7192* (det. Killip).—Puno: Cerros de Islay, *Isern 2476*. Ecuador?

Tournefortia virgata R. & P. Fl. Peruv. 2: 25, *pl. 150*. 1799.

Similar to *T. undulata* and apparently not well marked, but juvenile pubescence more persisting, canescent; leaves smaller, subcoriaceous, the fewer lateral nerves less regularly developed; inflorescence branches recurving and incurving; calyx lobes about linear, scarcely 2 mm. long, little longer in fruit; corolla tube scarcely 4 mm. long, rather stout, canescent puberulent, the undulate-crenulate lobes nearly 1.5 mm. broad; fruit white, not lobed, about 4 mm. in diameter, style obsolete.—Description from my collection, the white flowers (early yellowish) with a heavy, rather unpleasant fragrance; the many leaves, as in the similar species, are strongly waved or undulate in life so that they often crease in pressing. The Stork and Horton specimen in flower is doubtful; corollas about 1 cm. long, calyx scarcely 2 mm. long.

Huánuco: Mito, *1575* (det. Killip).—Junín: Huassa-haussi, *Ruiz & Pavón*, type.—Apurímac: Pincos, 2,700 meters, *Stork & Horton 10695?*

2. HELIOTROPIUM L.

Reference: Johnston, Contr. Gray Herb. 81: 1–73. 1928.

Shrubs, rarely herbs, with alternate leaves and white flowers often borne in scorpoid racemes or spikes. Ovary undivided, the fruit consisting of 4 nutlets or carpels, these remaining entire, biovulate when ripe, or breaking into 2 uniovulate nutlets at maturity. Corolla sinuses more or less plaited in bud. Anthers obtuse or acuminate, often more or less coherent.—Johnston's excellent revision of the South American species has supplied the following sectional key and the species key in part, except that vegetative characters have been emphasized, for convenience. Nidia Gangui has presented an attrac-

tive account with illustrations of the genus for the species of Argentina, Univ. Nat. Cordova 11: 481–559. 1955.

SECTIONAL KEY TO HELIOTROPIUM (after Johnston)

Carpels not cleft, finally separate biovulate nutlets.

Carpels with several empty cells besides the 2 fertile; corolla glabrous within.....section *Tiaridium* (Lehm.) Griseb.

Carpels with 2 cells, both usually fertile.

Corolla villous within; fruit adorned vesicularly.
section *Schobera* (Scop.) Johnst.

Corolla glabrous at least within; fruit (as carpels) smooth.

Plant prostrate-ascending; carpels often 1-seeded.
section *Hypsogenia* Johnst.

Erect shrubs; carpels normally 2-seeded.
section *Cochranea* (Miers) Reiche.

Carpels cleft, finally forming 2 uniovulate nutlets.

Tall shrubs; nutlets rough; anthers ciliate toward tip.
section *Heliothamnus* Johnst.

Herbs or usually less than 5 dm. tall; nutlets smooth, glabrous or pubescent; anthers, if pubescent, only at tip.

Stigmatic disk thick, narrow on more or less developed style; usually erect herbs or shrubs...section *Orthostachys* R. Br.

Stigmatic disk very broad, rather thin, sessile; prostrate, succulent herbs.....section *Halmyrophila* Johnst.

SPECIES KEY TO HELIOTROPIUM

Prostrate herbs; leaves small, rarely 2 cm. long, or narrow, succulent.

Succulent leaves soon exceeded by spikes (section *Halmyrophila*).
H. curassavicum.

Herbaceous leaves longer than inflorescences (section *Hypsogenia*).
H. microstachyum.

Erect or suberect, usually more or less ligneous; leaves never succulent, usually longer than 2 cm., always exceeded by spikes.

Herbs to ligneous, low; leaves mostly or all about 3, usually several times longer than wide; nutlets smooth; all section *Orthostachys* except *H. Krauseanum* (section *Cochranea*), perhaps *H. lanceolatum* (section *Heliothamnus?*).

Leaves crenulate, pale puberulent beneath, obtuse; carpels not cleft.....*H. Krauseanum.*

Leaves entire, subconcolor, more or less acute; carpels cleft.

Flowers clearly in bractless spikes.

Corolla rather showy, 4–5 mm. across or tube well exserted; anthers linear, apically pubescent or glandular except *H. procumbens.*

Corolla lobes rounded, tube and calyx subequal.

Plant canescent as calyx within.....*H. Lobbii.*

Plant green; corolla glabrous within.....*H. toratense.*

Corolla lobes more or less acute, the long tube prominent.

Anthers glandular-puberulent; corolla lobes acute. *H. oxylobum.*

Anthers crested with antrorse trichomes. *H. lanceolatum.*

Corolla small, 1–3 mm. wide, tube little exserted.

Shrub; leaves subcoriaceous; calyx segments suberect; flowers yellowish, glabrous.....*H. polyanthellum.*

Herbs or half-shrubs; leaves herbaceous unless oldest; calyx segments soon lax; flowers white.

Anthers (as corolla within) pubescent, linear, obtuse; leaves slightly narrowed apically, acute. *H. pilosum.*

Anthers glabrous, subovate, connective extended; leaves, at least mostly, rounded apically, mucronulate.....*H. procumbens.*

Flowers scattered on unevenly foliose branchlets..*H. piurense.*

Tall and (or) ligneous; leaves mostly or all about twice longer than wide except the subovoid *H. rufipilum*, sometimes *H. angiospermum* and the canescent shrubs *H. erianthum*, *H. lippioides;* nutlets rough, lacunose or sculptured except the only herbaceous species, *H. indicum.*

Herb, sparsely setulose-hispid; leaves decurrent on long petioles; fruit lobed, nutlets smooth (section *Tiaridium*). *H. indicum.*

Shrubs or ligneous below; indument, at least in part, pilose or crinkled; petioles short; nutlets rough (section *Heliothamnus* except *H. angiospermum*).

Carpels rough with obtuse vesicles, not cleft; leaves membranous, sparsely pilose as stems or glabrate; corolla villous within, small, tube and calyx subequal (section *Schobera*). *H. angiospermum.*

Carpels usually lacunose or sculptured, cleft; characters other than above at least in part (section *Heliothamnus*).

Leaves membranous, concolored, not rugose, often shorter than 5 cm.; corolla tube well exserted from the 1–1.5 mm. long calyx.....*H. adenogynum.*

Leaves subcoriaceous to membranous, rugose-bullate especially when shorter than 5 cm.

Leaves not or obscurely bullate but veins more or less obvious; corolla tube exserted.

Inflorescence lax, the branches soon several cm. long; style shorter than stigma.....*H. rufipilum.*

Inflorescence congested, branchlets nearly 2–3 cm. long; style longer than stigma....*H. arborescens.*

Leaves usually firm and more or less bullate or (and) gray pubescent beneath; corolla tube and calyx subequal or leaf-character pronounced.

Indument, especially flowering branchlets, somewhat fulvous; style shorter than stigma.

Calyx to 2 mm. long, longer in fruit.

Leaves 3–6 cm. long, oblong- or rarely subovate-elliptic, acute or subacute...*H. Urbanianum.*

Leaves ample, mostly ovate-acuminate, often about a dm. long or longer.....*H. submolle.*

Calyx inconspicuous, at most 1.5 mm. long in flower, little longer in fruit.....*H. Mandonii.*

Indument, even of branchlets, canescent; style longer than stigma.

Leaves lanceolate, 4–5 cm. long, 10–17 mm. wide. *H. erianthum.*

Leaves ovate or ovate-elliptic, about twice as long as wide.....*H. incanum.*

Leaves elliptic, 1.5–2 cm. long.....*H. lippioides.*

Heliotropium adenogynum Johnst. Contr. Gray Herb. 81: 42. 1928.

Laxly branched, more or less villous and usually glanduliferous, even the calyces, these globose, finally 2 mm. long, the elliptic-lanceolate erect or connivent lobes somewhat persisting; petioles 3–8 mm. long; leaves herbaceous, venose, ovate or oblong-lanceolate, 2–5 cm. long, acute or obtuse at base, acute at apex, 2–5 cm. long, about 0.5–3 cm. wide, paler beneath, entire; spikes 4–10 cm. long; corymb lax; corolla sparsely villous only without, not rarely glanduliferous, 2–3 times longer than calyx, to 4 mm. across, lobes orbicular; anther cells pubescent toward tip; ovary glanduliferous; style obsolete, stigma about 0.8 mm. long; nutlets ovate, rugose, 1–1.5 mm. long, stipitate-glandular.—Remarkably distinct by small flowers, glandular ovary and fruit, scarcely accrescent more or less deciduous calyces; most closely related to *H. Mandonii* Johnst. and evidently also to *H. rufipilum* (Benth.) Johnst. (author), a species varying in some if not all of these characters. Section *Heliothamnus* Johnst.

Lima: Chosica, *495*, type; *Weberbauer 5312; (Wilkes Exped.)*.

Heliotropium angiospermum Murray, Prodr. Stirp. Gott. 217. 1770; 10. *H. parviflorum* L. Mant. 2: 201. 1771. *H. synzystachyum* R. & P. Fl. Peruv. 2: 3, *pl. 109a.* 1799. *Tournefortia synzystachya* (R. & P.) R. & P. Syst. 4: 539. 1819. *Synzystachyum peruvianum* Raf. Sylva Tell. 89. 1838. *H. simplex* Meyen, Reise 1: 436. 1834, fide Johnston, Journ. Arnold Arb. 18: 18. 1937.

Perennial, sometimes flowering as an annual, rather sparsely pubescent, erect or becoming lax or prostrate, sometimes a meter long; petioles often to 1 cm. long or longer; leaves entire, oblong-lanceolate to elliptic, attenuate to base, acute, small or large (2–3 cm. long, 1–1.5 cm. wide, or 1.5 dm. long, 5 cm. wide); spikes solitary or binate, 5–10 (15) cm. long, ebracteate; calyx lobes acute; corolla white, glabrous but barbate within, about 2 mm. wide, the tube subincluded in the calyx; fruit depressed, 3–4 mm. across.—Section *Schobera* (Scop.) Johnst. l.c. 10. Fruit didymous (2-seeded carpels) and covered with unique vesicular structures.

Piura: Rocky slopes, Cerro Prieto, (*Haught & Svenson 11602*). Talara, *Haught 38; Horton 11592.*—La Libertad: Barranco near Pacasmayo, (*Forbes*).—San Martín: Tarapoto, *Woytkowski 35200.*—Lima: Chosica, *Mexia 04087.* Atocongo, *Pennell 14458a.* Río Chillón, *Pennell 14458.* Lurín, *Pennell 12217.* Santa Clara, *Rose 18626.* Callao to Lima, *52; Watkins 396* (and many others). Chancay, *Vargas 1235; Goodspeed 33033; Ruiz & Pavón* (type, *H. synzystachyum*).—Huancavelica: Near Pampano, *Weberbauer 5394* (part).—Ica:

Above Pisco, 1,550 meters, *Weberbauer 5394*.—Apurímac: Río Pachachaca, *Goodspeed Exped. 10537*.—Arequipa: Near Arequipa, *Meyen*. Murillo Bay, (*Macrae*).—Tacna: Arica, (*Meyen*, type, *H. simplex*). Bolivia to Central America, West Indies, Texas, Florida. "Alacran."

Heliotropium arborescens L. Syst. ed. 10. 913. 1759; 39. *H. peruvianum* L. Sp. Pl. ed. 2. 187. 1762. *H. corymbosum* R. & P. Fl. Peruv. 2: 2, *pl. 107a*. 1799.

Shrub, sometimes 2 meters tall, usually much lower, with many short branchlets with lavender-purple flowers; leaves typically ovate- or oblong-elliptic, more or less decurrent on the short or rarely 1–2 cm. long petioles, acute, ordinarily 4–8 cm. long, about half as wide or sometimes considerably larger, membranous or nearly, paler and venose beneath, more or less pubescent or glabrate above when smooth or inconspicuously bullate-rugulose in age; inflorescences 3–10 cm. across, lightly to densely strigose or villous, the short branchlets congested even in fruit; calyx segments subulate-linear, about 3–3.5 mm. long, not accrescent, the corolla tube about twice as long, appressed strigulose, lobes glabrate, rounded, 4–5 mm. across at top; anthers elongate, crested dorsally by a wavy antrorse trichome (Johnston); style longer than stigma; carpels pitted (lacunose), ellipsoid, medially and ventrally affixed by a definite elliptical areola (Johnston).—Var. *grisellum* Johnst. l.c. 40, differs in the longer, more canescent indument, the leaves usually rugose and more canescent beneath (all the southern Peru specimens; cf. *H. Mandonii*). As Johnston remarks, the Ancash specimens are not typical. An attractive flowering shrub forming large mounds or clumps. The native name "Vaynilla" refers to the fragrance (Ruiz & Pavón). Section *Heliothamnus* Johnst. Illustrated, Bot. Mag. *pl. 1609*.

Ancash: Below Ocros, 2,650 meters, *Weberbauer 2710?; Soukup*(?).—Lima: Matucana, *2938; Rose 18639*. Ambar, *Stork 11457*. Canta, *Pennell 14352; 14759; Mathews, Savatier*. Amancaës, *Weberbauer 1637; Soukup 3125*. Near Lima, *Ruiz & Pavón*, (type, *H. corymbosum*); *Dombey*.—Junín: Huancayo, Oxapampa, *Soukup 2438*.—Ayacucho: Coracora, 2,900 meters, *Weberbauer 5799*.—Arequipa: Posco, (*Cook & Gilbert 40*). Mollendo, *Weberbauer 1466; Hitchcock 22394; West 8206*. South of Chala, *Worth & Morrison 15686*. Quequena, *Eyerdam & Beetle 22180*.—Moquegua: Carumas, *Weberbauer 7272*, (type, var.).—Tacna: Without locality, (*Shephard*). "Docto" (Beetle), "vaynilla."

Heliotropium curassavicum L. Sp. Pl. 1: 130. 1753; 14. *H. curassavicum* L. var. *parviflorum* Ball, Journ. Linn. Soc. 21: 227. 1884.

A glabrous glaucous succulent, the branching prostrate stems sometimes elongating to a meter or so; leaves oblanceolate or obovate, often 2–4 cm. long, 0.5–1 cm. wide; spikes (bractless) often geminate; corolla typically 1–2.5 mm. long; anthers free, sagittate, the cells acuminate-appendaged; stigma column in Peruvian plants less than 0.2 mm. long, fruit 4-lobate, disk prominent, stigma broad. —An unmistakable plant of wet or low places especially when there is salinity; the white corollas are usually yellow at throat and somewhat purplish in age as sometimes the entire plant. Section *Halmyrophila* Johnst.

Piura: Alto de la Cruz, *Stork & Horton 11355.*—La Libertad: Toward Salaverry, *Worth 8891.*—Lambayeque: Chiclayo, *Stork 11430.* —Lima: Callao, *5881.* Río Rimac, (*Ball*) and many other collections. —Ica: Paracas Bay near Pisco, (*Forbes*).—Arequipa: Lomas, *Weberbauer 5732.* Mollendo, *Weberbauer 388; Eyerdam 25165.*—Tacna: Near Tacna, *Woitschach; Werdermann 711.* Chile and Patagonia to United States; West Indies.

Heliotropium erianthum Johnst. Contr. Gray Herb. 81: 41. 1928.

A canescent shrub, the branches and dense corymbs tomentose-villous, the leaves strigose-tomentulose above, tomentose beneath; petioles 5–8 mm. long; leaves lanceolate, acute both ends, 4–5 cm. long, 1– about 2 cm. wide, tessellate-rugose with impressed nerves above, obscurely crenulate, scarcely revolute; spikes 2–5 cm. long; calyx as corolla without appressed villous, the former orange, finally 4–5 mm. long, the lobes lanceolate-subulate, the latter 2.5–3 mm. long, limb about 3 mm. across, lobes rounded; anthers linear-oblong, the cells antrorsely pubescent dorsally toward tips; ovary glabrous, style 1–1.3 mm. long, stigma about 0.8 mm. long.—Resembles *H. incanum* R. & P. with harsh ascending indument, larger flowers; also *H. argenteum* Lehm., 42, of southern Ecuador, with slightly shorter style and ovate, less rugose leaves (author). With more collections it seems possible that Lehmann's species may be found to vary in these characters and, admitting any variation, the shrub will probably be shown to be a part of the Ruiz and Pavón species. Section *Heliothamnus* Johnst.

Piura: Huancabamba, *Weberbauer 6332*, type.

Heliotropium incanum R. & P. Fl. Peruv. 2: 2, *pl. 108a.* 1799; 41.

Shrub, often sprawling or openly branched, a meter or so high, with rather showy fragrant white or sometimes purplish flowers and brick red ovate or ovate-elliptic leaves, typically soon very rugose-bullate and green above, canescently pubescent and reticulate-venose beneath; leaves narrowed to the scarcely obvious petioles, acute, ordinarily 4–6 cm. long, about half as wide, thick, more or less subappressed hispid above, glabrate in age, densely and persistently villous tomentose beneath; corolla about 4 mm. across expanded top or somewhat broader; calyx lobes subulate-lanceolate, strigose; nutlets nearly 2 mm. long, faintly sculptured; otherwise like the similar *H. arborescens* which some forms approach closely (Johnston).—Section *Heliothamnus* Johnst. F.M. Neg. 17326.

Cajamarca: Chota, *Stork & Horton 10041* (det. Standley).—Huánuco: Near Huánuco, *3237; Ruiz & Pavón*, type. Huacho, *Stork & Horton 9405.* Ambo, *2423.*—Junín: Cabello above Huertas, *1327.* La Oroya, *Kalenborn 75.*—Huancavelica: Mejorada, *Stork & Horton 10916; Weberbauer 7604.*—Apurímac: Oropeza Valley, *Vargas 9768* (det. Standley). Pincos, *Stork & Horton 10674.* Río Pampas, 2,950 meters, *Weberbauer 5855.*—Cuzco: Ollantaitambo, *Herrera 231; Pennell 13640.* Vilcanota Valley, *Herrera 1080.* Urubamba Valley, *Herrera 1367; 1533.*

Heliotropium indicum L. Sp. Pl. 130. 1753; 19.

Sparsely hispid-setulose annual but often vigorous, several dm. to a meter tall, branching above; petioles alate toward leaf-blade, usually more than half as long as the ovate-elliptic to broadly lanceolate herbaceous venose leaves, these several cm. to a dm. long or longer, acute both ends or more or less cordate at base; spikes bractless, solitary, scorpoid, often becoming 2–3 dm. long; calyx lobes narrow, 2–2.5 mm. long; corolla blue or violet, sometimes white, the tube 2.5–4.5 mm. long, spreading limb 2–4 mm. across; anthers free; style short but slender; fruit glabrous, prominent lobes divergent, the eventually free nutlets angled, 2–3 mm. long.—Section *Tiaridium* (Lehm.) Griseb.; defined by its conspicuously ribbed multicellular glabrous fruit. Usually a weed in clearings; only a few collections cited. Illustrated, Univ. Nat. Cordova 11: *pl. 8*, opp. page 524.

Piura: Near Piura, (*Townsend 1393*).—San Martín: San Roque, *Williams 7801.* Juanjuí, *Klug 3436.* Tarapoto, *Woytkowski 33542.*

—Loreto: Soledad, *Tessmann 5260.* Near Iquitos, *Williams 1312; 1394.* Tropics and subtropics.

Heliotropium Krauseanum Fedde, Bot. Jahresb. 34, pt. 3: 72. 1908; 28. *H. saxatile* Krause, Bot. Jahrb. 37: 633. 1906, not Brandg., 1905.

Erect with arcuate-spreading flowering branches, to a meter tall, the densely leafy branchlets early somewhat pilosulous; leaves sessile but long and often narrowly attenuate to base, rounded at tip, oblong or oblanceolate, 2–5 cm. long, 4–8 mm. wide, crenulate, subcoriaceous, finely reticulate-veined and glabrate above, canescent puberulent-hispidulous beneath; spikes congested and densely flowered, 3–4 cm. long in fruit; calyx lobes linear, acute, minutely hispidulous, the nearly twice as long corolla tube sparsely so; corolla lobes white, glabrous, nearly triangular; filaments very short; style subequaling calyx.—Meritoriously named for a genial botanist of the Dahlem herbarium. Related to *H. taltalense* (Phil.) Johnst. of Chile, coarser with somewhat larger flowers, more pubescent calyces, larger fruits; may be a variety; resinous and pleasantly scented according to Johnston, who placed it in section *Cochranea* (Miers) Reiche. F.M. Neg. 17327.

Arequipa: Mollendo, *Johnston 3533; Weberbauer 1552,* type; 147. Atiquipa to the port of Chala, *Weberbauer 7188; Worth & Morrison 15647.* Chile.

Heliotropium lanceolatum R. & P. Fl. Peruv. 2: 4, *pl. 111a.* 1799; 40.

Shrub, the type with slender strigulose and sparsely hispidulous flowering branchlets; leaves crowded, oblong-lanceolate, narrowed to short petioles, acute or acuminate, mostly 2–3.5 cm. long, 4–6 mm. wide, rather densely appressed asperous hispidulous and rugulose above, crinkly puberulent and on the prominent nerves hispidulous beneath; flowers crowded, the inflorescence branchlets 1–2 cm. long; calyx segments linear-subulate, about 3 mm. long, sparsely strigulose as the half again as long corolla tube; corolla lobes rounded or subacute, the expanded top about 4 mm. across.—Characterized by small scabrous lanceolate leaves and lax corymb of long-tubed flowers; type locality listed as Huánuco in Ruiz and Pavón's journal but not found since, so perhaps that name referred to another species, as *H. incanum;* the anthers, according to the sectional character (fide Johnston) are crested dorsally by a row of crowded antrorse trichomes;

I have not dissected the one flower on type material seen. Section *Heliothamnus* Johnst. F.M. Neg. 17328.

Lima: Lurín, (*Ortega*); (*Wilkes Exped.*); (*Nation*). Toward Matucana, *Weberbauer 96*.—Huánuco: Pillao and near Huánuco(?), *Ruiz & Pavón*, type.

Heliotropium lippioides Krause, Bot. Jahrb. 37: 632. 1904; 42.

Suffruticose, the few slender strict erect branches brownish and glabrate below, toward the tip as the sparse leaves beneath more or less ashy tomentose; leaves sessile or essentially, elliptic, shortly narrowed at base, apically rounded but often mucronulate, 1.5–2 cm. long, about 8 mm. wide, coriaceous, revolute, grayish pilose above, strongly rugose by the impressed nerves; spikes 2–3 cm. long, densely flowered, alternately geminate; calyx hispid, the linear lobes somewhat spreading in fruit; corolla tube hispidulous, white, 6 mm. long or about 3 times longer than calyx, lobes undulate, subglabrous; filaments almost 1 mm. long; style short, conical, the stigma obtuse.—Seems to be nearest *H. incanum* R. & P. but leaves much smaller (author). Type was a meter tall. Section *Heliothamnus* Johnst. F.M. Neg. 17330.

Cajamarca: Santa Cruz, 1,650 meters, *Weberbauer 4122*, type; 189.

Heliotropium Lobbii Johnst. Contr. Gray Herb. 81: 54. 1928.

Canescently villous-hispid shrub; branches ascending, to 1.5 dm. long; leaves elliptic-oblanceolate, narrowed to petioles (these 1–2 mm. long), acute, 6–17 mm. long, 2.5–6.5 mm. wide, firm, conspicuously pale tomentose beneath, only midnerve prominent; spikes geminate, ebracteate, 1–2 cm. long; pedicels stout, to 1 mm. long; calyx (as corolla without) strigose, 2.5–3 mm. long, the subequal lobes linear-lanceolate; corolla funnelform, 4–5 mm. long, sparsely long-strigose in throat, cylindric tube 3 mm. long, limb 2.5–3 mm. across, lobes ovate; anthers sessile, obtuse, glandular; stigma cylindric, to 1 mm. long, 2–3 times longer than style.—Habit of *H. pilosum* R. & P. with corolla smaller and notably different in form (author). Section *Orthostachys* R. Br.

Amazonas: Chachapoyas, (*Lobb*, type).

Heliotropium Mandonii Johnst. Contr. Gray Herb. 81: 43. 1928.

Becoming a meter or two high, the laxly branched branches early fulvous-villous (trichomes retrorse), finally glabrescent; leaves lan-

ceolate or oblong-elliptic, reduced into villous petioles about 1 cm. long, acute, 7–14 cm. long, 2.5–6 cm. wide, scabrous, sparsely villous-hispid and often by the impressed veins strongly reticulate-rugose above, paler or canescently velutinous beneath; spikes villosulous, to a dm. long, in a terminal dichotomous corymb; calyx sessile, slightly villous, often glandular, globose, finally 2–2.5 mm. long with the ovate-lanceolate acuminate lobes little plicate in the ovate sinuses; corolla white, 3–4.5 mm. long, pubescent (often glandular) only without, the cylindric tube to two times longer than calyx, limb 3–5 mm. across, lobes obtuse; anthers densely pubescent toward apex; stigma sessile, 0.5 mm. long; ovary eglandular; nutlets 1.5 mm. long, lacunose, compressed, broadly affixed.—A coarse species very distinct from its relatives and suggesting a *Tournefortia* in gross aspect (author); simulates *H. arborescens* var. *grisellum* Johnst. but stigma sessile and inflorescence in age distinctive; flowers fragrant in my collections. Type is *Mandon 387* from La Paz, Bolivia. Section *Heliothamnus*.

Huánuco: Yanano, 1,800 meters, *3660*. Río Santa Domingo, 1,200 meters, *4206*.—Cuzco: Valle de Santa Ana, (*Herrera 899*). Bolivia.

Heliotropium microstachyum R. & P. Fl. Peruv. 2: 3, *pl. 110b*. 1799; 12. *H. brachystachyum* (DC.) Griseb. Gött. Abh. 24: 271. 1879. *Heliophytum brachystachyum* DC. Prodr. 9: 554. 1845.

A lightly strigulose perennial developing a ligneous caudex, the slender prostrate stems with glomerate inflorescences in the axils of the upper branchlets or leaves, these elliptic or suboblong, attenuate to the slender, usually short petioles, rounded or obtuse at apex, ordinarily 1.5–2.5 cm. long, 5–10 mm. wide, sometimes smaller or considerably longer, often glabrous or glabrate in age; nerves slender, impressed above, rather prominent beneath; inflorescences in fruit more or less spicate, a cm. or two long; calyx segments linear, about 2 mm. long; corolla 2–3 mm. across at top, glabrous, tube included, lobes rounded; carpels 2-celled, frequently maturing only a single seed (Johnston), lacunose, nearly 2 mm. long.—Johnston (who discovered the identity of the above names) noted that the upper plant figured on Ruiz and Pavón's plate 110 is by error labeled *H. pilosum*, a confusion in legend occurring elsewhere in their Flora of Peru. Section *Hypsogenia* Johnst. Illustrated, Univ. Nat. Cordova 11: *pl. 3*, opp. page 506. F.M. Neg. 17333.

Lima: Matucana, *202.*—Huánuco: Near Huánuco, *Dombey; Kanehira 258.* Ambo, *3168.*—Junín: Tarma, *Weberbauer 2370* (distr. as *H. paronichioides*); 176; *Ruiz & Pavón,* type.—Huancavelica: Huaytara, *Weberbauer 5427,* part.—Ica: Above Pisco, 2,650 meters, *Weberbauer 5427.*—Cuzco: Ollantaitambo, *Herrera 2254; Pennell 13660.* Near Cuzco, *Vargas 654.*—Arequipa: Cotahuasi, *Weberbauer 6871.*—Puno: Near Puno, (*Shepard 120*). Chuquibambilla, *Pennell 13358.* Altos de Toledo, 4,650 meters, *Meyen.*—Moquegua: Carumas, *Weberbauer 7484.* Ecuador to Argentina.

Heliotropium oxylobum Johnst. Contr. Gray Herb. 81: 57. 1928.

A shrub with many slender branches, sometimes 6 dm. tall, sparsely strigose with appressed curved trichomes; leaves lanceolate-linear or oblanceolate, narrowed to base (petioles 1 mm. long), acute, 1–2.5 cm. long, 1.5–4.5 mm. wide, firm, enervose, pale beneath; spikes single or paired, ebracteate, 2–6 cm. long; calyx subsessile, 1–2 mm. long, the sublinear lobes subequal; corolla yellowish, densely strigose without and slightly short-villous within above the middle, 4–5 mm. long, the cylindric tube 3–4 mm. long, lobes ovate-deltoid, acute; anthers to 1 mm. long, obtuse, glandular adhering; ovary glabrous or puberulent; stigma about 1 mm. long with thick disk, to two times longer than style; nutlets 1 mm. long, convex, inner face angulate.—Differs from *H. campestre* Griseb., known from La Paz southward, in its more slender habit, smaller leaves, more appressed indument and pubescence within the corolla. Simulates *H. lanceolatum* but apparently differs in anther character. Corolla yellowish or tube purplish (Goodspeed Exped.). Section *Orthostachys* R. Br.

Huancavelica: Río Mantaro below Surcubamba, *Weberbauer 6486.*—Apurímac: Bridge of Apurímac, (*Pearce,* type). Río Pachachaca, *Goodspeed Exped. 10544* (det. Standley, *H. pilosum*). Pincos, *Stork & Horton 10654* (det. Standley, *H. pilosum*).—Cuzco: Mayhua, Prov. Paruro, *Vargas 890* (det. Standley); *9735* (det. Standley, *H. pilosum*).

Heliotropium pilosum R. & P. Fl. Peruv. 2: 3, *pl. 110a.* 1799; 56.

Prostrate or spreading-ascending, sometimes a meter high, at least the tips canescent with more or less appressed pubescence; caudex ligneous as the prostrate-ascending older stems and few branches, the herbaceous younger with soft greenish lanceolate-elliptic leaves, attenuate to short petioles, acute, often to 3 cm. long,

to about a third as wide, the older flowering branches usually with narrowly oblong-lanceolate leaves, frequently firmer, acuminate, 2–5 cm. long, 5 mm. wide or narrower; inflorescence often composed of 2–3 spikes finally 5 cm. long or longer; calyx segments subulate-linear, 1.5 mm. long, little longer in fruit, lax; corolla almost minute, tube within and without strigulose, not at all or slightly exserted, lobes rounded.—Var. *albatum* Johnst. is merely a form with an abundant appressed pubescence (author). Plate *110b*, not *a* as captioned, is obviously this species; details incorrect; nutlets are 1 mm. long, sparsely hirsute-strigose, convex, the face distinctly acute; corolla is subsalverform with stout cylindric tube not surpassing calyx lobes. Section *Orthostachys* R. Br. F.M. Neg. 17339.

Ancash: Lomas de La Chay, *Goodspeed Exped. 9214*.—Lima: Hills of Lima, (*Nation*). Río Rimac, (*Ball*, type, var.); *Metcalf 30249*. Surco, 1,950 meters, *Weberbauer 5204* (var.). Atocongo, *Pennell 14786*. Chosica, *Weberbauer 5319*. Clays near Barranca, *Weberbauer 1649;* 147. Sandy seaside hills, *5922*. Amancaës, *Ruiz & Pavón*, type. Lurín, *5922*. Sayan, *Goodspeed 33043*.—Arequipa: East of Chala, *Worth & Morrison* (var.). Laspinas, 2,200 meters, *Eyerdam & Beetle 22159* (var.).

Heliotropium piurense Johnst. Amer. Journ. Bot. 33: 479. 1946.

Slender erect annual 1–2 dm. high, stem at base 1.5 mm. thick, dichotomously branched above; sparsely appressed strigose with curved antrorse trichomes; leaves oblanceolate, long-narrowed to slender petioled (1–2 mm. long), acute, 1–1.5 cm. long, 2–3 mm. wide above the middle, minutely strigose, enervate; spikes terminal, slender, 5–10 cm. long or longer, leafy-bracted; pedicels 0.5–1 mm. long; calyx sparsely strigose, the segments unequal, erect or suberect, lanceolate, acute, 2–2.5 mm. long, in fruit 3–3.5 mm. long; corolla white, cylindric, 2–4 mm. long, a little strigillose (only outside), lobes oblong, erect or nearly, little exceeding calyx; anthers extended apically, cohering; stigma broadly conical, to 3 mm. high and broad, subsessile; nutlets about 1 mm. high, ventrally angulate, pored, well-convex dorsally and pubescent with uncinate trichomes. —"Keys" in the author's revision, Contr. Gray Herb. 81: 49. 1928, to the southern *H. ocellatum* Cham., the calyx not uncinate pubescent; in this character resembles the northern *H. fruticosum* L. that is less slender and with a definite style (author).

Piura: Among sparse grasses, Cerro Prieto, *Haught & Svenson 11553*, type. Cabo Blanco, (*Haught 256*).

Heliotropium polyanthellum Johnst. Contr. Gray Herb. 81: 56. 1928.

Type a lax light green bush about 5 dm. tall, the many slender branches densely strigose; leaves narrowly lanceolate or oblanceolate, to about 1 cm. long, 2–4 mm. wide, gradually attenuate into the 1 mm. long petiole, acute, subcoriaceous, not veiny but midrib strong beneath; spikes single or geminate, slender, ebracteate, 4–6 cm. long; calyx subsessile, finally 1.5–2 mm. long, the slender lobes unequal; corolla yellowish, strigose only without, the cylindric tube 2–2.5 mm. long, less than 1 mm. thick, the limb 2–2.5 mm. across, lobes ovate; anthers linear, obtuse, sessile, lightly coherent by the glandulosity; ovary sparsely villosulous; stigma cylindric, about 0.8 mm., style obsolete; nutlets about 1 mm. long, strigose.—Relationship unknown (author). Section *Orthostachys* R. Br.

Cajamarca: Between Jaën and Río Shumba, 750 meters, *Weberbauer 6184*, type.

Heliotropium procumbens Mill. Dict. ed. 8, no. 10. 1768; 52. *H. inundatum* Sw. Prodr. 40. 1788.

Flowering as an annual but sometimes more or less enduring and ligneous toward base, green or subcanescent strigose; leaves often 1–2 cm. long, about half as wide, elliptic or somewhat obovate, narrowed to the much shorter petiole, rounded and mucronate at apex; spikes usually geminate, soon several cm. long; calyx segments subulate linear, about 1.5 mm. long, lax in fruit and 2.5 mm. long; corolla inconspicuous, the strigose tube slightly exserted; nutlets strigulose but smooth.—See Johnston for complete synonymy, as elsewhere; to it he added, after seeing types (Contr. Gray Herb. 92: 89. 1930), *H. americanum* Mill., l.c. no. 11, *H. brasilianum* Roth, Nov. Pl. Sp. 103. 1821, and *H. rigidulum* DC., Prodr. 9: 540. 1845; he notes species apparently sometimes perennial (Bolivian plateau) and flowers larger in southern part of range. Section *Orthostachys* R. Br. Illustrated, Univ. Nat. Cordova 11: *pl. 12*, opp. page 538.

Piura: Near Piura, *Spruce*.—Loreto: Middle Río Ucayali, *Tessmann 3111*. Argentina to United States.

Heliotropium rufipilum (Benth.) Johnst. Contr. Gray Herb. 81: 44. 1928. *Tournefortia rufipila* Benth. Bot. Sulph. 140. 1844.

Slender, sometimes a meter or two tall, the long stems or branches especially above more or less fulvous hispid with often somewhat viscid and usually spreading trichomes; leaves narrowly ovate-

elliptic, acute both ends or more commonly long-decurrent on short or elongate petioles and acuminate at apex, frequently about a dm. long, a third as wide or much larger, membranous, obscurely veined except in age when somewhat rugulose above, more or less hispidulous; inflorescences lax in age, the branches 4–15 cm. long; calyx segments subulate, 2 mm. long or about 3 mm. long in fruit, the lightly strigulose corolla tube slightly exserted; corolla lobes rounded, the flower 3–5 mm. across at expanded top.—There is considerable difference in leaf-form and flower-size between the Haught specimens determined by Johnston and others determined by him from Ecuador; typically with herbaceous leaves, veins little impressed, branches lax, spikes elongate, nutlets densely long-stiped glandular; var. *anadenum* Johnst., l.c., is a form or race with nutlets sparsely if at all glandular. Compare *H. submolle* Klotzsch and *H. Urbanianum* Krause, which will prove, probably, to be a part of this species; *H. adenogynum* Johnst. is scarcely more than a variant; Croton, Lantana and other Andean shrubs respond to local conditions similarly. Section *Heliothamnus* Johnst.

Piura: Talara, *Haught 70*. Pariñas Valley, *Haught 169*. Cerro Viento, *Haught 77* (var.).—San Martín: San Roque, *Williams 7804* (det. Standley). Zepelacio, *Klug 3488* (det. Standley).—Junín: Oxapampa, *Soukup 1810* (det. Ewan). Bolivia to Mexico.

Heliotropium toratense Johnst. Contr. Gray Herb. 81: 55. 1928.

Shrubby at base, decumbent-ascending, 1.5–2 dm. high, the many stems to 3 dm. long, spreading villosulous below, appressed pubescent to tips; leaves oblanceolate, gradually attenuate to base, acute, 3–6 cm. long, 4–8 mm. wide, herbaceous, veinless, obscurely strigillose, narrowly revolute; spikes terminal, geminate or ternate, 3–7 cm. long; calyx subsessile, 3–4 (finally 5) mm. long, sparsely strigose, the linear-acuminate lobes unequal; corolla about 4 mm. long, tube strigose only without, 2–3 mm. long, the limb 4.5 mm. across; anthers subulate, acuminate, obscurely granulate; stigma 0.3–0.4 mm. long, 4-lobate, subsessile; nutlets villous, 1.7 mm. long, convex, the inner face angulate.—Well-marked species of uncertain relationship (author). Section *Orthostachys* R. Br.

Moquegua: Torata, *Weberbauer 7407*, type.

Heliotropium Urbanianum Krause, Bot. Jahrb. 37: 633. 1906; 45.

Flowering branches, especially toward apex and crowded inflorescences, conspicuously fulvous villous-hispid as the younger leaves beneath, the older canescent; petioles 3–5 mm. long; leaves elliptic or early ovate-elliptic, acute at base, rounded or sometimes subacute at apex, usually 3.5–5 cm. long, about 2 cm. wide; inflorescences little longer than wide even in fruit, ordinarily only a few cm. long; calyx segments narrowly ovate-subulate, 2–2.5 mm. long, hispidulous; corolla blue, including the rounded lobes, more or less pilose, the stout tube barely exserted, the expanded flower about 4 mm. across; anthers 2 mm. long; style elongate-conical, shorter than stigma.—Distinguished from *H. rufipilum* at a glance (Johnston) but, as monographer remarks, characters mostly relatively developed; spikes and corolla-tubes usually stouter, leaves smaller, usually rugose and broadest at or above the middle, more pubescent, the trichomes often bulbous based, and, especially, calyx does not become globose. Section *Heliothamnus* Johnst. F.M. Neg. 17349.

Amazonas: Chachapoyas, (*Mathews*); perhaps same locality, (*Lobb*). Ecuador.

3. COLDENIA L.

Tiquilia Pers. Syn. 1: 157. 1805.

References: Johnston, Contr. Gray Herb. 70: 58–61. 1924; Journ. Arnold Arb. 16: 183–185. 1935.

Annual or perennial, sometimes more or less ligneous, often spreading or prostrate and the veiny or evenose leaves approximate or subtending the small flowers. Calyx 4–5-parted. Corolla funnelform or salverform, appendaged or smooth. Style 2-cleft or 2-parted. Ovary entire or 4-lobed, in fruit 4, rarely 2, separate nutlets, these attached basally, usually ventrally.

C. Nuttallii Hook. of western North America has been found in the Andes of Argentina according to Johnston, l.c. 75: 43. 1925; it is an annual with smooth ovoid nutlets, appendaged corollas. Most specimens being in flower, Johnston's key, which follows, is supplemented.

Nutlets plano-convex; stamens exserted.....*C. dichotoma.*

Nutlets spheroid to ovoid.

Nutlets narrowly ovoid with ventral scar; petioles usually villous-ciliate.....*C. paronychioides.*

Nutlets spherical; petioles not villous.

Corolla about 5 mm. long; stamens included.....*C. elongata.*
Corolla about 1 cm. long; stamens exserted.....*C. conspicua.*

SUPPLEMENTARY KEY

Flowers very obvious; stamens well-exserted; nutlets subspherical.
C. conspicua.
Flowers more or less obscure; stamens slightly or not exserted.
Leaves about 5–7 mm. long; nutlets narrowly ovoid.
C. paronychioides.
Leaves mostly or all about 1 cm. long or longer; nutlets subspherical to plano-convex.
Stamens included; nutlets spherical.....*C. elongata.*
Stamens visible; nutlets plano-convex.....*C. dichotoma.*

Coldenia conspicua Johnst. Journ. Arnold Arb. 16: 183. 1935.

Prostrate, the laxly branched stems sometimes a dm. long or longer, the younger finely hispidulous and more or less glanduliferous as the setose petioles (2–9 mm. long) and hispid calyces; leaves broadly lanceolate or elliptic, entire (or essentially), 5–13 mm. long, 2–5 mm. wide, closely and coarsely pustulate-asperous above, finely and erectly so beneath; calyx lobes linear, subindurate at base, about 9 mm. long, in fruit to 1.5 cm. long; corolla blue, tube 9 mm. long, limb 10–12 mm. across; throat smooth; stamens exserted; nutlets early about the top of a subcylindrical gynobase, this finally expanded, turbinate and the nutlets borne basally in the apical tissue by means of strophiodes.—Nutlets quite similar in size, shape and markings to those of section *Sphaerocarya* Johnst. Contr. Gray Herb. 70: 57. 1924. Johnston once referred the Pennell collections to the Chilean *C. grandiflora* Phil.; these appear to be annual or possibly biennial; flowers pale to blue-violet (Pennell), leaves 1.5–2 cm. long.

Arequipa: Sand flat near Mejia and Cachendo, (*Guenther & Buchtien 155*, type; det. Bruns, *C. dichotoma*); *156*. Mollendo, (*Stafford K60*); *Mexia 94178*. Quishuarani, 1,860 meters, *Pennell 13044*. Sand dunes, Tiabaya, 2,100 meters, *Pennell 13059*.

Coldenia dichotoma (R. & P.) Lehm. Asperif. 1: 9. 1818; 58. *Lithospermum dichotomum* R. & P. Fl. Peruv. 2: 5, *pl. 111c*. 1799. *C. Dombeyana* Juss. acc. to Buck, Index DC. Prodr. 3. 108. 1858.

C. pentandra Juss. acc. Steud. Nomencl. 212. 1821. *Tiguilia dichotoma* (R. & P.) Pers. Syn. 1: 157. 1805.

Slightly suffrutescent with rugose veiny leaves, bark papery, soon exfoliating, early shortly glandular pilosulous; petioles 5–10 mm. long; leaves hispidulous or glabrate, especially above where bullate by the strongly impressed nerves, mostly oblong-obovate, revolute, crenulate, about 12–15 mm. long, 5–6.5 mm. wide; corolla 3–4 mm. wide, bluish-pink, little longer than the sublinear hispid sepals; stamens well-exserted.—Nutlets 2, 1.5–2.5 mm. long, strongly convex dorsally, finely tessellate-granulate, strongly brown-mottled, the anterior face flat, spreading to form circular patches sometimes 15 dm. across (Johnston).

Piura: Talara, *Haught 6; Johnston 3517; Eyerdam 9008.* Parinas valley, *Haught 158.*—La Libertad: Salaverry, *Johnston 3522.*—Lima: On the lomas, *Weberbauer 5713;* 144. Lurín, *Ruiz & Pavón,* type; *5946.* "Tiquil-tiquil" (Ruiz & Pavón).

Coldenia elongata Rusby, Descr. New Sp. S. Am. Pl. 107. 1920; 185. *C. parviflora* Phil. as to Johnston, l.c., fide Johnston, Journ. Arnold Arb. 16: 185. 1935.

Irregularly branched, shrubby, lower stems glabrate, exfoliating, younger more or less densely villous-hispid; petioles slender, shorter than the oblong obtuse leaves, these with 4–5 pairs of veins impressed above, in type to 7 mm. long, 4 mm. wide, usually larger, oval-ovate, obtuse both ends, revolute; calyx lobes linear, about 5 mm. long, long pilose-hispid; corolla about 5 mm. long, the tube about 1.5 mm. long, the lobes subrotund; stamens included; nutlets 4, spherical or nearly, attached by a small basal circular scar, smooth, lustrous, about 0.5 mm. thick or somewhat larger, brown in type, perhaps black at full maturity.—The elongate, usually crenate leaves, tomentose petioles and calyces distinguish this from *C. parviflora* Phil. of Chile (Johnston).

Arequipa: Yura, (*Williams 2562,* type; *2521?* nutlets larger); *Karl Schmidt* (det. Standley, *C. dichotoma*). Below Arequipa, *Weberbauer 6837.* Lomas, Prov. Camana, *Weberbauer 5730; 5734.* Adjacent Chile.

Coldenia paronychioides Phil. Cat. Itin. Tarapaca 55. 1891; 60. *Lithospermum aggregatum* R. & P. Fl. Peruv. 2: 4. 1799. *C. aggregata* Rusby, Descr. New Sp. S. Am. Pl. 106. 1920, not based on R. & P. type.

Prostrate, greenish or canescently appressed to spreading hispidulous with minute pale blue to white flowers, early herbaceous but soon ligneous toward base and openly sprawling, in age sometimes several dm. in diameter; petioles 1–3 mm. long; leaves oblong-oblanceolate, mostly about 5 mm. long, 1.5–2 mm. wide; corolla nearly hidden in the pubescence of the linear calyx lobes, these only about 3 mm. long; nutlets narrowly ovoid, lustrous, minutely reticulate; habit of *C. dichotoma*, with which it sometimes grows (Johnston).

Piura: Talara, *Haught 33; Pennell 12202; Goodspeed Exped. 9004; Horton 11555; West 3572; Beetle 26204.* Near Piura, *Weberbauer 5932.* Negritos, (*Haught & Svenson 17606*). Paita, *Pennell 14819;* (*Safford 9; Ball; Williams 2913*, type, *C. aggregata* Rusby); *Weberbauer*, 154.—La Libertad: Salaverry, *Johnston 3523.*—Ancash: Los Zorros, *Goodspeed Exped. 9197.*—Lima: Quive, *Pennell 14305.* Sta. Eulalia, *Goodspeed 33092.* Sayán, *Goodspeed 17358.*—Junín: Near Tarma, *Ruiz & Pavón* (type, *L. aggregatum*).—Arequipa: Tingo, 2,100 meters, *Pennell 13102.*—Puno: Pisacoma, (*Meyen*, distr. as *Heliotropium humifusum*, fide Johnston). Northern Chile; Bolivia. "Flor de arena" (Stork).

4. CORDIA L.

Trees or shrubs, in Peru broad-leaved and the inflorescence various. Calyx mostly persisting. Corolla white or yellowish, red to orange in *C. sebestena* (cultivation), the lobes 5–9 (–15). Stamens 5–10. Ovary usually 4-celled, ovules 1–4. Style terminal, well-developed, 2-lobed or 2-parted, the branches each 2-lobed; stigmas 4. Fruit usually a drupe with dry or more or less mucilaginous exocarp, or carpoid wall, chartaceous and fibrous (section *Gerascanthus*).—Genus first described in detail anatomically by Mez, Bot. Jahrb. 12: 526–588. 1890. Johnston's "The Boraginaceae of Northeastern South America," Journ. Arnold Arb. 16: 1–64. 1935, is an invaluable contribution to the knowledge of this family and I hope I have correctly compiled his painstakingly observed and recorded observations pertaining to the Peruvian species.

The red or orange flowered *C. sebestena* L. is probably grown in Peru for ornament; it is native to the northern coasts of South America and the West Indies.

Corolla persisting (marcescently); calyx costate.

Calyx teeth obscure; fruit enclosed.

Leaves lanceolate, about three times longer than wide. *C. iguaguana.*

Leaves oval to ovate in some degree and usually about twice as long as wide.

Leaves usually longer than wide.

Flowers about 1.5 cm. long..... *C. alliodora.*

Flowers about 4 cm. long..... *C. insignis.*

Leaves suborbicular..... *C. lutea.*

Calyx with long subulate teeth; fruit exserted.... *C. varronifolia.*

Corolla deciduous after drying; calyx (in Peru) not tubulate nor strongly costate nor ovate and subulate-lobed.

Nodes inflated; stems notably long-hispid..... *C. nodosa.*

Nodes not inflated; stems glabrous to variously pubescent.

Flowers showy, in globose heads; peduncles to 1 dm. long; calyx teeth filiform..... *C. macrocephala.*

Flowers small, sometimes capitate but calyx lobes obscure, rarely subulate-appendaged; peduncles often short.

Branches remotely spurred or nodular by persisting petiole-bases; flowers usually congested in spikes or heads, disposed rather laxly only in *C. Poeppigii;* fruit often shorter than 5 mm.

Inflorescences usually simple, in any case densely flowered (cf. *C. Poeppigii*).

Leaves evenly serrate, ample, with subulate teeth to 2 mm. long, 3–5 mm. apart..... *C. macrodonta.*

Leaves entire, minutely or densely or unevenly serrate, usually only a few cm. wide (key characters below variable, expedient).

Inflorescences soon clearly longer than broad, spiciform.

Leaves coarsely and unevenly serrate.. *C. peruviana.*

Leaves entire to more or less serrate but closely or evenly..... *C. cylindristachya, C. spinescens.*

Inflorescences usually forked or capitate, especially in flower.

Leaves more or less acuminate and acutely, membranous or firm, not or obscurely rugose unless in age, usually glabrate or sparsely pubescent; cymes small, early dense or capitate.

Inflorescence axillary.....*C. patens.*

Inflorescence extra-axillary .....*C. bifurcata.*

Leaves if acuminate shortly and not or scarcely acutely, usually rounded to subacute, subcoriaceous, reticulate-rugose, often rather softly pubescent beneath; flowers often capitate even in age.

Leaves subentire or remotely serrulate.

Flower heads often several on more or less leafy branchlets.

Calyx lobes subulate-appendaged; branchlets spreading hirsute.....*C. buddleoides.*

Calyx lobes acute; branchlets lanate. *C. mollissima.*

Flower heads or small forked cymes solitary; branches soon glabrate.....*C. scaberrima.*

Leaves obviously even if rather minutely, serrulate or crenate.

Leaves oblong- or ovate-elliptic unless young shoots, slightly rounded to subacute. *C. Krausiana.*

Leaves rather ovate, more or less obtusely and broadly acuminate, scabrous above. *C. scaberrima.*

Leaves subrotund, hispidulous both sides. *C. lantanoides.*

Inflorescences mostly compound or foliose, the branches rather laxly flowered .....*C. Poeppigii.*

Branches smooth or in any case inflorescences soon lax or sometimes simple but laxly flowered or open and flowers crowded, usually not simple or not typically small; fruit often 5 mm. long or longer.

Leaves rather ovate, often acutely acuminate; inflorescence branches few, elongate, simple or subsimple, suberect. *C. Poeppigii.*

Leaves rather elliptic, cuspidate or acute or if acuminate, abruptly or shortly; inflorescence branches short, often many.

Leaves glabrous or essentially, even beneath any indument minute and obscure; ovary glabrate or glabrous.

Calyx long-obconic, 6 mm. long in bud; corolla to 12 mm. long; ovary glabrous.....*C. Mexiana.*

Calyx campanulate or pyriform, 2.5–4 mm. long; corolla to about 5 mm. long.

Petioles 2–3 cm. long, geniculate at base; calyx lobes uneven.....*C. collococca.*

Petioles shorter or in any case straight; calyx lobes obscure, equal.....*C. lomatoloba.*

Leaves strigose or scabrous at least in part; ovary pubescent except *C. hebeclada, C. Ulei, C. ucayaliensis,* sometimes *C. ripicola.*

Flowers much congested; leaves (as to types) clearly pubescent beneath.

Inflorescence lightly pubescent.
C. laevior, C. ripicola.

Inflorescence reddish tomentose.....*C. Sprucei.*

Flowers not congested or inflorescence branchlets long; leaves minutely pubescent or scabrous.

Petioles about 1 cm. long; leaves mostly or all narrowed to acute base.

Branchlets puberulent; calyx about 4 mm. long.

Leaves scabrous, nearly three times longer than wide; ovary pubescent.....*C. scabrifolia.*

Leaves pubescent both sides, about twice as long as wide; ovary glabrous...*C. ucayaliensis.*

Branchlets hirsutulous; calyx about 5 mm. long.
C. Ulei.

Petioles about 1.5–2 cm. long; leaves broadly rounded or shortly acute at base or very dissimilar.

Ovary pubescent; larger leaves often acute or narrowed to base.....*C. toqueve.*

Ovary glabrous; all leaves rounded or truncate at base.....*C. hebeclada.*

Cordia alliodora (R. & P.) Oken, All. Naturgeschichte, Bot. 2: 1098. 1841; 13. *Cerdana alliodora* R. & P. Fl. Peruv. 2: 47, *pl. 184.* 1799.

More or less densely stellate-pubescent with small or minute forked trichomes, especially the ample inflorescences; petioles 1–3 cm. long; leaves rather broadly elliptic, obtusely acute both ends or acuminate apically, usually 1–5.5 dm. long, about half as wide, entire, coriaceous, glabrous above where slightly marked by the impressed nerves and veins, these rather prominent beneath; inflorescence terminal, laxly branched, the flowers crowded; calyx nearly globular, strongly 10-ribbed, canescent-puberulent, truncate, 6–7 (14) mm. long, the teeth minute, the exserted corolla tube with oblong rounded lobes, these 5–10 mm. long, usually about 3 mm. wide; fruit fibrous, chartaceous, 5 mm. long, about 3 mm. thick, falling within the persisting calyx tube and corolla.

A distinctive feature of the plant is its myrmecophily (cf. Wheeler, Bull. Mus. Comp. Zool., 90: 9–41. 1942); the leafy twigs and frequently the axis of the inflorescence develop as irregular swellings which serve as ant domatia; see also *C. nodosa*. Small ants sometimes totally destroy the leaves, cutting them into triangular pieces and storing them symmetrically; each piece may be six times the size of the ant that carries it by the shortest side, apparently like a sail (Ruiz & Pavón). See Johnston, l.c., for extra-Peruvian synonymy; he remarks that there is only moderate variation in the species, in size of flowers and degree of pubescence. In Peru sometimes attains 20 meters or more, the trunk (bark grayish, fissured) 3 dm. or more in diameter; timber used for construction and for vehicles (Williams); leaves and bark used as a condiment, serving as garlic (Ruiz & Pavón); flowers fragrant.

Cajamarca: Hualgayoc, *Soukup 3839*.—San Martín: Tarapoto, *Williams 6751*.—Huánuco: Pozuzo, *Ruiz & Pavón*, type.—Loreto: Lower Itaya, *Williams 318*. Lower Huallaga, *Williams 4306*.—Cuzco: Urubamba Valley, *Weberbauer*, 280.—Río Acre: Upper Río Jurupary, *Krukoff 5220*. Seringal Auristella, *Ule 9719*. Bolivia to Mexico; West Indies.

Cordia bifurcata Roem. & Schult. Syst. 4: 466. 1819. *Varronia dichotoma* R. & P. Fl. Peruv. 2: 23, *pl. 146*. 1799, not *C. dichotoma* Forst., 1786.

Slender, shrubby below, often openly branched above, the leafy flowering branchlets minutely and sparsely appressed strigillose and (or) scabrous as the green leaves at least above, these sometimes also hispidulous on the veins beneath; petioles about 3 mm. long; leaves usually ovate- or oblong-elliptic-lanceolate, obliquely acute at base,

acutely acuminate, 6–7 cm. long, about 2 cm. wide near the middle or sometimes (as freely interpreted) broadly ovate, rounded at base, 3–4.5 cm. wide and only about twice as long, subentire to remotely serrate above the middle, membranous, paler beneath; peduncles 1–2 (4) cm. long, terminal on leafy branchlets or from the leaf-axils of branchlets, the small inflorescences capituliform in flower, obviously and subumbellately 2–4-dichotomously branched only in fruit when sometimes about 3 cm. across, half as long; calyx appressed strigillose, glabrate and reddish in fruit, with broad almost minute lobes, about 3 mm. long or about half as long as the fleshy usually white corolla; fruits bright red, ovoid-elliptic, 3.5–4 mm. long.—Probably a species variable in pubescence, leaf-form, flower color and perhaps in position and form of inflorescence (compare *C. patens*, *C. scaberrima* and others). Johnston, in 1930 (Contr. Gray Herb. 92: 30–34), under the name *C. corymbosa* (L.) G. Don, commented at length on apparent variability and, as regards pubescence, proposed forma *typica*, leaves finely tomentulose beneath, coarse trichomes few or lacking; f. *intonsa*, coarse trichomes abundant; f. *detonsa*, pubescence fine, appressed; and f. *hirsuta*, pubescence coarse, spreading. In 1949 (Journ. Arnold Arb. 30: 90) he wrote, using the name *C. bifurcata* Roem. & Schult.: flowers minute, orange, in terminal or internodal cymes, these usually forked even in bud. Material determined by Johnston after 1949 had white flowers, according to the collectors. Johnston, l.c. 30: 90 et seq. 1949, has argued, apparently correctly, for the validity of this species, confused with *C. lineata* (L.) Roem. & Schult., doubtfully in South America, and *C. polycephala* (Lam.) Johnst., also known only north of Peru; both have the axillary inflorescence of *C. patens* HBK.

Confusion in interpretation of the shrub's characters has been equaled by the nomenclature; professional taxonomists apparently ought to be reminded of the old truism that whatever name used the rose is still a rose or words to that effect; *Tournefortia syringaefolia* Vahl is a case in point, apparently with another name, *T. maculata* Jacq. in spite of its retaining the same "spots;" however, if a botanical compiler overlooks or misapplies a rediscovered or reinterpreted name may heaven forgive him!

Piura: Canchaque, Prov. Huancabamba, *Stork 11417* (det. Johnston, *C. macrodonta*).—San Martín: Tarapoto, *Ule 6478; Woytkowski 35074; Williams 5408; 5571; 6177; 6426; 6684A*.—Huánuco: Chacahuasi, *Ruiz & Pavón* (type, *V. dichotoma*). Tingo María, *Allard 20494* (det. Lyman Smith, *C. polycephala*). Río Santo Domingo,

4210. Pozuzo, *4560*.—Junín: La Merced, *Killip & Smith*. Prov. Tarma, *Woytkowski 37003*. Argentina to Costa Rica.

Cordia buddleoides Rusby, Mem. Torrey Bot. Club 6: 83. 1896; 34.

Branchlets elongate, spreading hirsute; petioles stout, very short to nearly 1 cm. long; leaves ovate, abruptly contracted at base, acute, 7–10 cm. long, 3–5 cm. wide, obsoletely serrulate, firm-membranous, scabrous and the 6 or so lateral nerves impressed above, strigose beneath, the veins strongly reticulate; inflorescence ample, leafy, in type the flowers capitate; calyx tube 1.5 mm. long, lobes subulate-linear, 3 mm. long, reflexed; corolla little exserted, stamens included; ovary slightly 4-lobed, style nearly 2 mm. long, 4-cleft.—After author except that he describes branchlets as harshly tomentose; the small heads are on long peduncles and form a somewhat leafy open inflorescence. *Ule 9714* from Río Acre in Bolivia has flowers in a cylindric spike, probably due to greater maturity than type with globose inflorescences from La Paz, matched by Lechler; the Poeppig collection lacks the apical calyx lobe appendages (Johnston); this northern shrub may rather be *C. scaberrima* HBK. or affine. Name originally spelled as above.

Loreto: Maynas (Yurimaguas), (*Poeppig 2471*).—Puno: San Gován, (*Lechler 2424*). Bolivia.

Cordia collococca [Sandmark] L. Amoen. Acad. 5: 377. 1759 (as *C. callococca*). *C. glabra* of authors, not Linnaeus; cf. Johnston, Journ. Arnold Arb. 21: 345; 1940, l.c. 30: 123–124. 1949.

Essentially glabrous, the indument of the open, dichotomously branched inflorescence and leaves beneath obsolete or extremely minute; petioles 2–3 cm. long; leaves elliptic-obovate, obliquely rounded or subacute at base, broadly acuminate or rounded and apiculate at apex, submembranous, finely reticulate-veined both sides, the 7–9 lateral nerves slender; calyx obscurely puberulent, cupulate, about 4 mm. long, unevenly lobed; corolla about 5 mm. long; ovary glabrous; drupes bright red.—Deciduous, dioecious, the flowers precocious, the leaves beneath pubescent with many slender erect bristles (Johnston); umbrella-shaped, 5 meters tall, with pendent ("weeping") habit (Mexia).

Loreto: Rancho Indiana, *Mexia 6403* (det. Johnston). To Cuba and Mexico. "Camungo-tiarina" (Mexia).

Cordia cylindristachya (R. & P.) Roem. & Schult. Syst. 4: 459. 1819. *Varronia cylindristachya* R. & P. Fl. Peruv. 2: 23, *pl. 147a.* 1799. *V. macrostachya* R. & P. l.c. as to plate. *C. tarmensis* Krause, Bot. Jahrb. 37: 630. 1906, fide Killip. *C. subserrata* Krause, l.c. 627.

Branchlets and leaves beneath more or less fulvous or cinereous tomentose-pilose; petioles 4–10 mm. long; leaves elliptic or ovate-elliptic, acute both ends, varying in size from about 3 cm. long, 2 cm. wide, to a dm. or so long, 4 cm. wide or under, submembranous to coriaceous, entire or subserrate toward tip, rugose, sparsely hispid both sides or tomentulose beneath; spikes terminal and axillary, usually 3–5 cm. long; calyx densely pilose, lobes ovate, acute, the slightly longer glabrous or subglabrous corolla tube about 4 mm. long, the lobes short; filaments affixed about medially, dilated and villous toward base; style subequaling calyx.—According to Johnston, Journ. Arnold Arb. 30: 121. 1949, *C. curassavica* (Jacq.) Roem. & Schult., ranging north of Colombia and similar, differs constantly in the complete lack of axillary spikes.

Cajamarca: Socota to Tambillo, *Stork & Horton 10178* (det. Standley).—Huánuco: Acomayo and Pillao, *Ruiz & Pavón*, type; *Woytkowski 34002.* Chaglla, *3641.*—Junín: Near Palca, *Weberbauer 1758; Killip & Smith 23372.*—Cuzco: Marcapata, near Cachupampa, *Vargas 9696.*—Arequipa: Mollendo, *Weberbauer 1530.*

Cordia hebeclada Johnst. Journ. Arnold Arb. 31: 176. 1950.

Tree to 15 meters tall with regular dichotomous branches, dimorphic leaves and strongly heterostyled flowers, unisexual by abortion; branchlets and leaves beneath densely puberulent; petioles often 1–2 cm. long; leaves laxly or appressed subscabrous above, the larger elliptic-lanceolate or -ovate, rounded at base, more or less acuminate, 1.5–2.5 dm. long, 7–15 cm. long, the smaller suborbicular or orbicular-ovate, frequently 8–10 cm. long, often truncate or subcordate at base, rounded or obtuse at apex; inflorescence corymbose, 1–3 dm. across; male flowers with cupulate calyx 3–4.5 mm. long, densely puberulent but strigose within, the unequal lobes acute; corolla 6–8 mm. long, oblong recurved lobes and tube 3–4 mm. long; filaments about 4 mm. long, villous basally; ovary rudimentary, glabrous; female flowers similar but calyx subcylindric, 2.5–3 mm. long, filaments glabrous or very sparsely villous; style exserted, 3.5–4 mm. long, bifid; drupe glabrous, depressed globose, strongly rugose, to 1 cm. long, 8 mm. broad, the expanded fruiting calyx 4–5 mm. across.—Probably most closely related to *C. panamensis*

Riley, but differing in indument and in its regular dichotomous branching; in *C. hebeclada* the indument consists of a great abundance of minute trichomes that give a thin downy uniform very soft cover (Johnston), scarcely soft in age; perhaps an Andean variant of *C. tetrandra* Aublet in which the author included it, Contr. Gray Herb. 92: 55. 1930.

San Martín: Morales near Tarapoto, *Williams 5676*. Chazuta, *Klug 4050*. Bolivia to Colombia. "Tahnampa-caspi" (Williams); "quitasol" (Little), or "jutumbe" (Tafalla) in Ecuador. "Renaquillo" (Klug).

Cordia iguaguana Melchior ex Johnst. Journ. Arnold Arb. 33: 63. 1952.

Tree, 8–20 meters tall, branchlets finely fulvous tomentulose, glabrate in age, petioles to about 2 cm. long; leaves broadly lanceolate, obtuse or rounded at base, acute or somewhat attenuate at apex, 1–1.5 dm. long, 4–5 cm. wide, glabrous or minutely and sparsely appressed pubescent, the 5–7 lateral nerves and many veins lightly impressed above, rather prominent beneath; paniculate or corymbose inflorescences terminal on young leafy branches, about 1.5 cm. across; calyx clavate-cylindrical, prominently 10-costate, about 11 mm. long, 3 mm. thick toward the apex, obscurely appressed-puberulent, the 3–5 often unequal obtuse lobes about 1 mm. long, the sinuses obtuse; corolla white, 23 mm. long, limb about 2.5 cm. broad, lobes 6–8 mm. long, 8–10 mm. wide, often emarginate, tube 8 mm. long, 1–1.5 mm. thick, tomentulose within below the middle, the throat 10–15 mm. across, about 5 mm. deep; filaments glabrous, affixed near apex, 1–3 mm. long, the anthers also unequal, 1.5–3 mm. long; ovary with style about 13 mm. long (nectary lacking), forked about 1 cm. above the fusiform base.—Section *Gerascanthus* with three other species known from western South America; *C. alliodora* (R. & P.) Oken has stellate indument and is myrmecophilous, the other species not and furthermore their indument is simple; *C. Goeldiana* Huber, Amazonian Brazil to Colombia, has long oblong corolla lobes while *C. macrantha* Chodat, of western Ecuador, with the broad rounded corolla lobes of *C. iguaguana*, has corollas 3.5–4 cm. long, larger elliptic leaves evidently villous aspidulose beneath, and differs otherwise according to Johnston, who, agreeably, took up the well-chosen herbarium name of Melchior. F.M. Neg. 975.

Cajamarca: Near Jaën, 700–800 meters, *Weberbauer 6213*, type. "Iguaguana."

Cordia insignis Cham. Linnaea 8: 122. 1833. *C. Haenkeana* Mez, Bot. Jahrb. 12: 560. 1890, fide Johnston, Journ. Arnold Arb. 16: 179. 1935.

Branchlet tips densely more or less ferrugineous tomentulose with simple trichomes as the terminal corymbose-paniculate inflorescences, the ultimate branches of these few-flowered; petioles to 4 mm. long; leaves ovate or suboval, rather rounded at base, basally narrowed to finally rounded apex, about 14 cm. long, 9 cm. wide, subglabrous and lustrous above, strigose beneath where prominently reticulate-veined; calyx costate, 2.5 cm. long, anthers often with few irregular teeth; corolla to 4 cm. long, coriaceous, persisting, the 5 lobes emarginate; stamens nearly 2 cm. long, affixed near base, joined annulately, included; ovary glabrous.—Description after Mez, who remarked: evidently differs from *C. insignis* in form of leaves and inflorescence. I greatly doubt that the Haenke collection came from Peru; *C. insignis* is known only east and south of the Amazon Basin, from eastern Brazil to eastern Bolivia, and is certainly not to be expected in Peru (Johnston). There are apparent exceptions known to this range unless determinations have been wrong; *C. insignis* may have ovate-oblong leaves, flowers in dense cymes. Illustrated, Mart. Fl. Bras. 8, pt. 1, *pl. 1* (*C. insignis*).

Peru(?): See note above; without locality except "Peru: Haenke" (type, herb. Monac.).

Cordia Krausiana Killip, Journ. Wash. Acad. Sci. 17: 330. 1927. *C. pauciflora* Krause, Bot. Jahrb. 37: 629. 1906, not Rusby, 1896.

Flowering branches somewhat ferrugineous tomentose as the 3–5 mm. long petioles; leaves elliptic or ovate-elliptic, acute both ends, in type 2.5–3 cm. long, 12–16 mm. wide, apparently often larger, subcoriaceous, rugose, hispidulous and the veins impressed above, tomentose and the veins conspicuous beneath, clearly, even coarsely serrate; flowers capitately congested, few in type or in vigorous examples many; calyx 5–6-parted, the pilose subacute segments 3 mm. long; corolla tube glabrous, little exserted, the lobes rounded; filaments affixed just above middle, short, villous at dilated base; style slightly exceeding calyx, stigma globose.—Related to *C. scaberrima* HBK. but with smaller, more strongly serrate leaves (Krause); if the shrub is specifically distinct it seems vegetatively at least to differ only in the serrate leaves, these in my collections to 8 cm. long, 3 cm. wide, the flower-heads in fruit 2 cm. thick, the calyx and drupe about 6 mm. long. On the other hand this and the

plant of HBK. are doubtfully distinct specifically from the Tarapoto shrub here referred to *C. bifurcata* but not typical. F.M. Neg. 991.

Ancash: Tamanco to Huaraz, 3,000 meters, *Weberbauer 3161*, type.—Lima: Matucana, *180; 2884* (det. Killip, *C. lantanoides*).

Cordia lantanoides Spreng. Syst. 1: 653. 1825. *Varronia crenata* R. & P. Fl. Peruv. 2: 23, *pl. 146b.* 1799, not *C. crenata* Delile, 1813.

Branches tortuous, the many leafy flowering ones minutely hirsutulous; petioles slender, to about 6 mm. long; leaves subrotund to oval-elliptic, rounded both ends, 2–3 cm. long, 1.5–2 cm. wide, crenate-serrulate nearly to base, submembranous, spreading hispidulous both sides, slightly asperous and rugulose above, reticulate venose beneath; peduncles axillary, 2–3 cm. long, to 4-dichotomous in fruit but the flowers early in small heads; calyx glabrate in fruit, about 4 mm. long, the ovate lobes acute, the white corolla little exserted; drupe red, seed ovoid, rarely 2-celled (Ruiz & Pavón).—Apparently not found in typical state since the original collection but possibly should be drawn to include *C. Krausiana* Killip. F.M. Neg. 980.

Huánuco: *Ruiz & Pavón*, type.

Cordia laevior Johnst. Journ. Arnold Arb. 16: 180. 1935.

Branchlets soon glabrescent, only toward tips shortly pubescent with appressed or ascending trichomes; petioles 5–10 mm. long; leaves similar, oblong-lanceolate, acute at base, long-acuminate, 1.5–2.5 dm. long, 4–10 cm. wide, glabrous above except the hirsutulous midrib and 7–8 lateral nerves (tertiary obscure), paler beneath where puberulent on the many veins; cymes in forks of branches, the lower branches spreading; calyx in bud obovate, 4–5 mm. long, 2–3 mm. thick, rounded apically, obscurely costate, densely puberulent, the triangular lobes somewhat uneven; corolla tube 4 mm. long, lobes 2 mm. wide and long; style sparsely pilose, the filaments toward base, the ovary evidently toward apex.—Less pubescent than the related more eastern *C. Sprucei* Mez and cyme more loosely branched; leaves not roughened above by the many veinlets; distributed as *C. Ulei* Johnst. with glabrate ovary, coarser pubescence (author). It seems desirable to study these species with more material before their true status (as that of *C. ripicola*) can be discovered. Type a tree 6 meters high.

San Martín: Pongo de Cainarachi, (*Klug 2756*, type).

Cordia lomatoloba Johnst. Journ. Arnold Arb. 18: 12. 1937.

Arborescent, to 25 meters tall, nearly glabrous; leaves similar, lanceolate or elliptic-lanceolate, narrowed to petiole—this 8–15 mm. long—acute or acuminate, 8–14 cm. long, 2–5.5 cm. wide, glabrous or obscurely strigose, reticulate both sides, lustrous above, paler and opaque beneath, entire; primary nerves 6–8 pairs; cymes often somewhat brown-pubescent in the forks of the branches, these lax, slender; calyx sessile, pyriform, 2.5 mm. long, abruptly contracted to base, the deltoid equal teeth only marginally obvious; corolla white, 4 mm. long, tube 1 mm. long, lobes about 1.8 mm. wide, oblong, recurved, rounded at tip; filaments villous below; ovary glabrous.—Related to the pubescent *C. naidophila* Johnst. of the Amazon, distributed as *C. ecalyculata* Vahl with much narrower leaves, while *C. diospyrifolia* Cham. as to type by Sellow has coriaceous broader leaves; the characters may prove to be variable.

San Martín: Chazuta, *Klug 4050?*—Loreto: Mouth of the Río Santiago, *Tessmann 4454* (det. Melchior, *C. diospyrifolia*).—Río Acre: Mouth of Río Macauhan, *Krukoff 5497*, type; also *5345*. Brazil.

Cordia lutea Lam. Ill. 1: 421. 1791. *C. marchionica* Drake, Ill. Fl. Ins. Pacific 240 (1892), fide Johnston, Journ. Arnold Arb. 33: 65. 1952. *C. rotundifolia* R. & P. Fl. Peruv. 2: 24, *pl. 148a*. 1799.

Flowering branchlets many, canescent-lanate to puberulent including the conspicuously ribbed calyces of the showy pale yellow flowers; petioles 1–2.5 cm. long; leaves subrotund to broadly ovate-elliptic, mostly 4 or 5 cm. wide and little longer, sometimes much larger, weakly crenulate, early canescent short-pilose beneath, harshly scabrous above; calyx soon obconic, about 1 cm. long, teeth subulate; corolla a clear light yellow, 3 cm. long or longer, the throat dilated, the limb 6–8 lobed; filaments villous at base; fruit ovoid, white.—Johnston, l.c., has presented arguments that seem irrefutable that the common occurrence of this species in the Marquesas is due to its introduction by the French during the nineteenth century, probably as an ornamental. A decoction is used with good results for jaundice (Ruiz & Pavón); an attractive yellow-flowered bush along streams. F.M. Neg. 994.

Tumbez, fide Diels.—Piura: Near La Brea, (*Haught & Svenson 11596*); *Weberbauer 5955*.—Cajamarca: Huambos, *Stork & Horton 10205*.—Lambayeque: Chiclayo, *West 3575*.—Ancash: Tambo de Pariacota, *2557*. Talara, *Horton 11516*. Pabur, *Stork 11422*.—Lima: Lurín, Chancay, *Ruiz & Pavón* (type, *C. rotundifolia*); *Dom-*

bey, type.—Huánuco: Marañón Valley, *Weberbauer*, 155.—Loreto: Mishuyacu, near Iquitos, *Klug 1482*. Western Ecuador; Galapagos Islands. "Tina" or "membrillejo" (quince); "oberal" (Weberbauer).

Cordia macrocephala (Desv.) HBK. Nov. Gen. & Sp. 3: 77. 1818. *Varronia macrocephala* Desv. Journ. de Bot. 1: 273. 1808. *C. polyantha* Benth. Pl. Hartw. 121. 1843? *C. guayaquilensis* DC. Prodr. 9: 496. 1845.

Often many-stemmed, matted or erect and sometimes 5 meters tall, the flowers in well-peduncled heads, the coarsely crenate or obtusely serrate leaves greenish but more or less scabrous both sides, conspicuously veined, to about 6 cm. long, 2.5 cm. wide, often smaller, ovate- or oblong-elliptic, obtuse or subacute.—Johnston, Journ. Arnold Arb. 30: 89. 1949, remarks that the similar *C. polyantha* Benth., Pl. Hartw. 121. 1843, "of Ecuador and northern Peru," and *C. macrocephala* (Desv.) HBK., of Peru, have a relative in *C. Pringlei* Robins. of more northern range. A pubescent or glabrate shrub striking by the globose inflorescences of white flowers. Pubescence of unfolding leaves during dry period may consist of closely packed stellate scales while in the wet period stellate and single hairs are greatly elongate and forked hairs are on some specimens (Svenson, Am. Journ. Bot. 33: 479. 1946). F.M. Neg. 984.

Piura: Amotape Hills, (*Haught & Svenson 11523*). Near Frias, *Weberbauer 6433*. Serrán, *Stork 11373* (det. Johnston, *C. polyantha*). —Lambayeque, fide Weberbauer.—Lima: Chosica, *542; Mexia 04009*. Sta. Eulalia, *Goodspeed 33018; Horton 10994*. Sayán, *Goodspeed 33042; 33046*. Río Rimac Valley, *Goodspeed, Weberbauer & Metcalf 30217*.—Junín: Huacapistana, *Killip & Smith 24518* (det. Killip, *C. floribunda*). To Colombia.

Cordia macrodonta Killip, Journ. Wash. Acad. Sci. 17: 328. 1927.

Branchlets quadrate, ferrugineous-puberulent and finely pilosulous (as leaves beneath), scabrous; petioles 5–10 mm. long; leaves broadly ovate, narrowed to base, abruptly short-acuminate, 6–12 cm. long, 4–6.5 (8) cm. wide, coarsely and acutely serrate except in lower third, membranous, shortly strigillose-hispid above, lateral nerves 6–7 pairs; peduncles 4 cm. long; flowers solitary (or few) at ends of the inflorescence branchlets; calyx globose-turbinate, 2 mm. long, appressed rusty-strigillose, the acute teeth 0.5 mm. long; corolla tube cylindric, 3.5 mm. long, stamens in throat; fruit ovoid-conic, 5 mm.

long, glabrous.—After author, who remarked: distinguished from other members of the Corymbosae DC. by the coarsely serrate leaves; may prove to be a part of the variable *C. bifurcata* Roem. & Schult. as suggested by *Stork 11417*.

Piura: San Antonio, Prov. Huancabamba, *Weberbauer 6015*, type.

Cordia Mexiana Johnst. Journ. Arnold Arb. 18: 12. 1937.

Tree, 5–7 meters, with puberulent branches; leaves elliptic or oblong-elliptic, abruptly contracted to petiole, this 1–2.5 cm. long, obtusely acuminate, 1.5–4 dm. long, 8–20 cm. wide, coriaceous, reticulate both sides, glabrous, lustrous and minutely puncticulate above, subpuberulent beneath; nerves 5–7 pairs; cymes laxly much branched, 2.5 dm. across, the flexuose branchlets strigose puberulent; calyx (bud) about 6 mm. long, 2 mm. thick, stouter above, densely brown strigose, puberulent within above the middle, the 5 deltoid erect lobes about 1 mm. long; corolla white, 12 mm. long, tube 1.5 mm. thick, 4 mm. long, throat obvious, 2.5–3 mm. long, gradually expanded to about 3 mm. across, lobes oblong, 4 mm. long, recurved, rounded; filaments exserted, villous below; ovary glabrous; style deeply forked. —Distributed as *C. colombiana* Killip of Ecuador and Colombia but distinct because of the elongate corolla with well-developed throat; this character, and the long tube, are very unusual in the *Pilicordia* section (author).

Loreto: Río Marañón near Rancho Indiana, *Mexia 6459*, type. Adjacent Colombia.

Cordia mollissima Killip, Journ. Wash. Acad. Sci. 17: 330. 1927.

Densely lanate-tomentose even the contracted or early subelliptic few-flowered inflorescences; branches terete; petioles to 1 cm. long; leaves ovate-lanceolate, rounded or subacute at base, acute or acuminate, to 7 cm. long, 3.5 cm. wide, serrulate, reticulate-veined, dark green above, paler beneath; calyx campanulate, about 2 mm. across, the deltoid lobes acute; corolla 3–3.5 mm. long; stamens and style about 1.5 mm. long, the ovate-oblong anthers scarcely exserted.—Related to *C. corymbosa* (L.) Don. (*C. bifurcata* Roem. & Schult.) but differing in the white indument and the closely serrulate leaves (author).

Cajamarca: Jaën, *Weberbauer 6202*, type.—Amazonas: Chachapoyas, (*Mathews 3134*).—San Martín: Juanjuí, *Klug 4385* (det. Standley, *C. scaberrima*).

Cordia nodosa Lam. Tab. Encycl. 1: 422. 1791; 46 and 13. *C. hispidissima* DC. Prodr. 9: 475. 1845.

Distinctive by enlarged nodes below each fork, these hollow, ordinarily inhabited by ants; marked also by the divaricate rufous or brownish bristles that are usually more or less developed about the apiculate calyx tip; petioles 2–5 mm. long; leaves usually subopposite or whorled, somewhat dissimilar, often elliptic, 1–3 dm. long, obtuse at base, acuminate, lustrous, more or less bullate at limb in age, the 6–10 pairs of nerves impressed, reticulate; paniculate cymes sessile or peduncled, up to a dm. across, usually puberulent with crinkly curved trichomes or the papyraceous scarcely ribbed calyx strigillose, 5 mm. long in bud, unevenly lobed, ordinarily persisting and becoming fibrose; corolla white, 4–6 mm. long; style and ovary pubescent (filaments basally); fruits yellow, usually more or less bristly, about 1.5 cm. long.—Shrub or tree sometimes 10 meters high, few branches, bark fissured with many small lenticels (Williams, Field Mus. Bot. 15: 433. 1936), nearly smooth except at nodes to densely bristly (forma *hispidissima*). I. W. Bailey, Bot. Gaz. 77: 32–49, *pls. 6–7.* 1924, gave an account of myrmecophilism here, a curiosity occurring among Peruvian plants, notably in Melastomaceae and Moraceae; this intriguing development was investigated first by A. F. W. Schimper, Bot. Mitteil. Trop. Heft 1: 53–. 1888, and by Schumann, Pringsheim's Jahrb. 382–. 1888.

San Martín: Tarapoto, *Williams 6516.* Juanjuí, *Klug 3775.*—Huánuco: Tingo María, 700 meters, *Stork & Horton 9519.* Valley of the Monzón, Prov. Huamalies, *Weberbauer 3679;* 285.—Junín: Río Pichis, *Killip & Smith 26731.* Hacienda Schunke, 1,400 meters, *Killip & Smith 24582.* Perené Bridge, *Killip & Smith 25359.*—Loreto: Florida, *Klug 2158; 2305.* Río Nanay, *Williams 330A; 1229.* Caballo-Cocha, *Williams 2334.* Río Mazán, *José Schunke 10.* Yurimaguas, *Killip & Smith 27688; 27728; Williams 4305; 4677.* Iquitos, *Williams 3748; 7974; Killip & Smith 27022; Klug 480; 510; 803.* La Victoria, *Williams 2679.* Río Itaya, *Killip & Smith 29602.* Bolivia to the Guianas. "Almenchillo," "analliocaspi" or "ayahuasco" (Williams); "ibrachoreri" (Huitoto); "pucacurocaspi" (Schunke).

Cordia patens HBK. Nov. Gen. & Sp. 3: 75. 1818.

Young branchlets and leaves beneath densely flavescent tomentulose; petioles 4 mm. long; leaves ovate-oblong, rounded at base, acute or acuminate, to 7.5 cm. long or longer, rather remotely serrulate toward tip, firm, reticulate and strigose-scabrous above, the veins and

nerves prominent beneath; spikes subglobose, axillary and terminal on slender peduncles 5 cm. long; calyx strigose-hispid with minute subulate teeth, villous in the throat as the white twice as long corolla; stamens exserted, exceeded by the style.—After HBK. Inflorescences axillary, not extra-axillary as in *C. bifurcata* (Johnston); Peruvian collection was referred to *C. bifurcata* (*C. corymbosa* (L.) Don) by Standley and Killip and the leaves are not yellowish tomentulose beneath as are those of the type from Venezuela, which in this character resembles Tarapoto material. F.M. Neg. 38979.

Loreto: Yurimaguas, *Killip & Smith 28262; Williams 3898; 3947; 4469; 4787.* Contamana, Río Ucayali, *Killip & Smith 26876.* To the Guianas.

Cordia peruviana Roem. & Schult. Syst. 4: 459. 1819. *Varronia obliqua* R. & P. Fl. Peruv. 2: 24, *pl. 147b.* 1799, not *C. obliqua* Willd., 1797.

Similar to *C. spinescens* but leaves coarsely and irregularly serrate, obliquely decurrent at base, mostly 5–6 cm. long, 2.5–3 cm. wide somewhat below the middle, submembranous, lightly scabrous and in age rugulose above, hispidulous on the reticulate veins beneath; spikes puberulent, long-pedunculate in the upper axils, several cm. long in fruit; calyx lobes acute.—Determinations by Killip; seems to have little to recommend it as a distinct species but the leaf-indentation is rather more than an extreme variation of that of *C. spinescens* L.

Ancash: Tambo de Pariacota, *2546.*—Lima: Chosica, *2862.* Matucana, *302.*—Junín: Tarma, *Ruiz & Pavón,* type.

Cordia Poeppigii DC. Prodr. 9: 492. 1845.

Open or rather compact shrub, the long flowering branches often supported in thickets, early more or less hispidulous with spreading subappressed or incurved trichomes; petioles 5–10 mm. long, deciduous above the base; leaves ovate-elliptic, more or less rounded at base and acutely acuminate, a dm. or so long, 4–6 cm. wide, those in the inflorescence reduced, all except type ex char. sparsely scabrous with incurved trichomes above, hispidulous beneath especially on the slender nerves and rather obscure veins, submembranous, not or obscurely rugulose; inflorescence when well-developed composed of a number of slender branchlets from upper leaf-axils, and finally 3 dm. long or longer; calyx subpapyraceous, glabrous or nearly, at least typically, about 2.5 mm. long, the ovate lobes acute; corolla greenish-

white, campanulate, 4.5 mm. long, the subglobose anthers barely exserted from the subtruncate limb, and well-exceeded by the slender forked style; fruit ovoid, 4 mm. long, finally red, the calyx not or tardily splitting.—Type, "Central Peru, Poeppig." Determinations by Killip. F.M. Neg. 7735.

San Martín: Near Tarapoto, *Williams 6969.*—Huánuco: Chicoplaya, *Ruiz & Pavón.* Pozuzo, *4561.* Pampayacu, *5042.*—Junín: Colonia Perené, *Killip & Smith 24990.*—Loreto: Iquitos, *Tessmann 3560* (det. Melchior, *C. floribunda*); *Williams 3543; 8031; Killip & Smith 27127; Klug 1344; Mexia 6507.* Caballo-Cocha, *Williams 2060* (toward *C. scaberrima?*). "Barillas" (Mexia).

Cordia ripicola Johnst. Journ. Arnold Arb. 16: 180. 1935.

Resembles *C. laevior;* branchlets scabrous with short trichomes; petioles 2–6 mm. long, leaves uniform, more oblong or somewhat obovate, 8–14 cm. long, 3–7 cm. wide, sparsely appressed strigillose above, closely and appressed hispidulous-puberulent beneath; calyx (type) strigose, subpapyraceous, unevenly rupturing into 2–5 lobes; corolla lobes about 2.5 mm. long; style and ovary sparsely pubescent or the latter glabrous.—Calyx character, appressed leaf pubescence and pubescent pistil separates this from *C. Ulei* Johnst. and the scattered appressed trichomes and much appressed ones beneath from *C. Sprucei* Mez. (author) of southwestern Brazil. The Schunke specimen is nearly glabrous, or only scabrous; cf. *C. laevior* Johnst.

San Martín: Juanjuí, *Klug 4231* (det. Standley, *C. Sprucei*).—Loreto: Mouth of Río Zubineta, (*Klug 2262,* type). Río Mazán, *José Schunke 292* (det. Killip). "Chore-ey."

Cordia scaberrima HBK. Nov. Gen. & Sp. 3: 71. (55). 1818.

Branches glabrous, younger tetragonous, scabrous as the leaves both sides, these rugose, serrate, oblong, narrowed to petioles (4 mm. long), rigid, reticulate-veined, acuminate or acute, the nerves and midrib strigose scabrous above, veins scabrous or pilose-hispidulous beneath; corymbs terminal, dichotomous, the heads sometimes 2 cm. long, 1.5 cm. thick, often tardily forked; calyx striate, hispid or more or less hispidulous, 5 mm. long in fruit with broad ovate lobes.—The Junín specimen has leaves in shape toward var. *ecuadorica* Killip but subentire, and an ellipsoid tardily forked inflorescence. The Williams specimen with peduncles 2 cm. long, heads globose, 7 mm. thick, calyx 3 mm. long may be the same as one by Poeppig referred by Johnston with doubt to *C. buddleoides* Rusby, the calyx without

the subulate tips (appendages) that are very evident on that species. The Huánuco plant, var. **ecuadorica** Killip, in herb. foliis plus minusve serratis dense piloso-hirsutis, may be distinct and indeed has been so designated under a similar name by Johnston. The peduncles are leafy, the globose heads to 2.5 cm. in diameter, calyx in fruit to 7 mm. long. F.M. Neg. 997.

Piura: Ayavaca, *Bonpland*, type.—Huánuco: Mito, *3328*. Yanano, *3789*.—Junín: Huacapistana, *Killip & Smith 24518* (det. Killip, *C. floribunda*).—Loreto: Santa Rosa, Yurimaguas, *Williams 4779* (det. Killip). Ecuador.

Cordia scabrifolia A. DC. Prodr. 9: 485. 1845; 53.

Branchlets and inflorescences minutely puberulent; leaves elliptic-lanceolate, acute at base, acutely short-acuminate, not markedly dissimilar, shortly appressed scabrous-strigose above or pustulate, sometimes smooth and glabrous(?), beneath green, on the nerves pubescent with some very short, usually inwardly directed stout trichomes; calyx cupulate, about 3 mm. long, nearly as broad, the lobes about even; corolla about 5 mm. long; anthers nearly 2 mm. long, exserted; ovary pubescent.—No doubt occurs in Peru.

Río Acre: Seringal Auristella, *Ule 9717*. Mouth of Río Macauhan, *Krukoff 5336; 5672*. Amazonian Brazil; British Guiana.

Cordia spinescens L. Mant. 2: 206. 1771. *Varronia ferruginea* Lam. Tab. Encycl. 1: 418. 1791; Poir, Encycl. 4: 263. 1797. *C. ferruginea* (Lam.) Roem. & Schult. Syst. 4: 458. 1819. *C. pyrifolia* Willd. ex Roem. & Schult. l.c. 802. *C. Thibaudiana* DC. Prodr. 9: 489. 1845. *C. pauciflora* Rusby, Mem. Torr. Bot. Club 6: 83. 1896.

Petiole bases persisting spur-like on the upper branches, the branchlets, petioles and peduncles more or less tomentulose or reddish-hirsute; petioles 5–10 mm. long, leaves often broadly ovate-elliptic, 7–15 cm. long, about half as wide, acute both ends or more or less abruptly acuminate at apex, scabrous above, more or less villous-hispidulous beneath, entire to obsoletely to coarsely serrulate, firm to subcoriaceous, the nerves and reticulate veins correspondingly conspicuous; peduncles on the upper petioles or several in a terminal inflorescence, 1–several cm. long; spikes often few-flowered, sometimes ellipsoid, calyx somewhat campanulate, to about 4 mm. long, the ovate lobes acute, corolla 5–8 mm. long, tube glandular (Worth & Morrison).—The persisting indurated spur-like petiole bases suggested the name according to Johnston, who worked out the synon-

ymy, Journ. Arnold Arb. 30: 104. 1949; includes also the Colombian *C. laxiflora* HBK. and *C. riparia* HBK. Nov. Gen. & Sp. 3: 72. 1818, and 71, *pl. 207* (*C. riparia*). But it is not clear that the breaking down of the petiole cells does not occur irregularly and its taxonomic significance is therefore debatable. F.M. Neg. 1020 (*C. pyrifolia*).

Arequipa: South of Chala, *Worth & Morrison 15697*. Bolivia to Mexico.

Cordia Sprucei Mez, Bot. Jahrb. 12: 549. 1890; 53. *Lithocardium Sprucei* (Mez) Ktze. Rev. Gen. 2: 977. 1891.

Branchlets apically strigose, subferrugineous-tomentulose, glabrate, terete or nearly; petioles to 7 mm. long, geniculately incurved at base; leaves suboval or obscurely obovate, to 1.5 dm. long, 7 cm. wide, attenuate to rounded base, acutely acuminate, subglabrous and very lustrous above, pubescent beneath, prominently reticulate both sides; inflorescence terminal, laxly paniculate, ferrugineous tomentulose, much shorter than leaves; calyx before anthesis entire, urceolate, ecostate, irregularly much lobed, very slightly strigose within; corolla with stamens to 8 mm. long, more than three-fourths divided, the 5 rounded lobes finally reflexed; filaments affixed nearly at throat, long pilose at base, anthers glandular at tip; ovary yellowish pilose as style at base; stigma discoid; drupe tomentulose, to 12 mm. long, 7 mm. thick, the calyx scarcely enlarged.—After author, who placed it in section *Pilicordia;* species confused by Fresenius, in Mart. Fl. Bras. 8, pt. 1: 16, with *C. umbraculifera* A. DC.

Peru (perhaps). Rio Negro, Brazil.

Cordia toqueve Aublet, Pl. Guian. 1: 228, *pl. 90*. 1775; 52. *C. heterophylla* Poir. Dict. Sci. Nat. 10: 409. 1818, fide Johnston.

Branchlets, slenderly branched inflorescence and leaves beneath softly puberulent-tomentulose; leaves strongly dissimilar, those on a single branch suborbicular to broadly ovate, alternate or opposite; larger, long-elliptic, narrowly ovate or lanceolate-oblong ones, often acute or narrowed to base, rounded or acute at apex, finely pubescent, especially on midrib and lateral nerves or the younger velvety (Schunke); calyx short conic or proculiform, about 3.5 mm. long, opening unevenly; corolla about 4 mm. long; anthers oblong, scarcely 1 mm. long.—At once distinct from all relatives with strongly heteromorphic foliage by the obviously pubescent ovary, fruit and leaves (Johnston).

Loreto: Lower Río Nanay, *Williams 578*. Mouth of Río Santiago, *Tessmann 4125*. Río Mazán, *José Schunke* 360 (det. Killip). To eastern Brazil and northern South America. "Bacuri" (Williams).

Cordia ucayaliensis Johnst. Journ. Arnold Arb. 16: 181. 1935. *C. Ulei* Johnst. var. *ucayaliensis* Johnst. Contr. Gray Herb. 92: 57. 1930.

Resembles *C. Ulei* but leaves more obovate-elliptic, about 1.5 dm. long, 8–9 cm. wide, and, especially, finely, sometimes sparsely appressed strigose and scabrous above, rather softly hispidulous to puberulent beneath; fruiting calyx scarcely lobulate, 8 mm. across, the ellipsoid fruits 12 mm. long, about 7 mm. thick.—The validity of the above name may be questioned as the place of publication of the synonym is not given; readily distinguished from *C. ripicola* by the scabrous-strigose upper leaf surface (author). Type a 6-meter tree, the half as tall trunk 2 dm. in diameter, but Williams noted it twice as high, the short trunk tortuous.

Loreto: Flood-free forest, Yarina Cocha, *Tessmann 5457*, type. Caballo-Cocha, *Williams 2333*. Yurimaguas, *Williams 3832; 4387*. Without data, *Poeppig 2196*.

Cordia Ulei Johnst. Contr. Gray Herb. 92: 56. 1930.

Branchlets hirsutulous, petioles 5–12 mm. long; leaves obovate-oblong or oblong-lanceolate, mostly broadest above the middle, below this cuneately contracted or rarely abruptly obtuse or rounded to base, at apex often rounded or obtuse and abruptly acuminate (acumen 5–10 mm. long), appressed pubescent beneath, above glabrous or sparsely puberulent on the 5–6 nerves, these prominent beneath and verrucosely joined by transverse veins; inflorescence terminal, finally short-pedunculate, laxly paniculate, scarcely exceeding the leaves; flowers sessile; calyx poculiform, lightly appressed strigose, 4–5 mm. long, 2 mm. thick; corolla nearly 8 mm. long, 5-merous, tube cylindric; filaments exserted, villous below; ovary quite glabrous.—Probably most closely related to *C. Sprucei* Mez with pubescent ovary (author); adjacent to southeastern Peru and doubtless occurring in the general region; a tree attaining 12 meters (Ule).

Loreto: Iquitos, *Tessmann 3613* (det. Killip, *C. Sprucei*).—Río Acre: Seringal San Francisco, *Ule 9716*, type.

Cordia varronifolia Johnst. Journ. Arnold Arb. 33: 62. 1952.

Branchlets, leaves beneath and long-ribbed calyces more or less villosulous; petioles 2–5 cm. long; leaves elliptic-oblong or ovate-oblong, obtuse or rounded at base, subobtuse, 4–9 cm. long, 2–4 cm. wide, often crenate-dentate except toward base, densely and minutely areolate-bullate and with short flexible bulbous-based setae, beneath deeply reticulate-venose; cymes few-flowered, usually terminal, early condensed, solitary or rarely geminate, becoming 1–2 cm. long; calyx 10-costate, 1.5–2 cm. long, tube 10–12 mm. long, 4–8 mm. thick below the middle, 3–4 mm. at the top, rounded at base, lobes subulate, flexuose, 5–9 mm. long, free in bud, the sinuses broad, obtuse; fruiting calyx to 2.8 cm. long, tube 17 mm. long, 8 or 9 mm. thick; corolla marcescently persisting, funnelform, 3–3.5 cm. long; limb 2.5–3.5 cm. across, the semicircular lobes 1 cm. wide, 5–7 mm. long, emarginate, narrow sinuses strongly acute, the tube about 1 cm. long, 2–3 mm. thick, lineately villosulous below within, the throat to 12 mm. across at top; ovary glabrous, attenuate, 4-ovulate, obscurely annulate at base; style villosulous, 1.5–2.5 cm. long, fork 12–20 mm. above the base, the very narrow lobes 2–3 mm. long; fruit dry, ovoid, enclosed by calyx and persisting corolla-tube, the endocarp bony, 4-celled, apparently 4-seeded.—The bullate leaves suggest species in section *Varronia*, the long-persisting calyx and corollas members of the section *Gerascanthus;* actually allied to *C. parvifolia* DC. and *C. elaeagnoides* DC. of Mexico, section *Rhabdocalyx*, the three known species characterized by the nut-like fruit (Johnston). The widely distributed type collection was designated as a new species in many herbaria under the name of the collector by the author's eminent friend Killip. Type was 2–3 meters tall.

Cajamarca: Pión, valley of the Marañón, Prov. Cutervo, *Weberbauer 7138* (type).

5. SACCELLIUM Humb. & Bonpl.

A tall smooth tree with alternate entire or remotely dentate leaves and terminal leafy panicle, the fruiting calyces long-pedicellate, accrescent, oblanceolate-elliptic, 5-dentate, membranous, reticulate-venose (or more or less nerved?). Flowers unknown. Drupe included, obovoid globose, beaked by subulate style, tetragonous above, sub-4-lobed, little fleshy, the cells 1-seeded, 4 with 2 cavities at the base of each; seeds albuminous, the cotyledons long-plicate.

Saccellium lanceolatum Humb. & Bonpl. Pl. Aequin. 1: 47, *pl. 13*. 1806.

Branchlets hirtellous toward tip; leaves lanceolate, acute both ends, reticulate-veined, the principal nerves prominent beneath, hirtellous both sides, less than 1.5 dm. long, 7.5 cm. wide, petioles 8–10 mm. long; peduncles superaxillary or terminal, branches few, about 2 dm. long, the filiform subapical pedicel 6–10 mm. long; calyx straw colored, pulverulent to about 2.5 cm. long, the drupe 4 or 5 times shorter, lustrous, fragile below, bony above; seed ovoid, pyriform, glabrous.—The flowers according to HBK. Nov. Gen. & Sp. 7: 161, were described by Bonpland: limb 6-parted, lobes equal, corolla segments 5, style 1, stigma bifid. The distinctly lanceolate leaves and the long foliose branches readily characterize the species (Johnston, Journ. Arnold Arb. 16: 183. 1935). Shrub or tree to 6 meters tall, the accrescent calyces yellowish-green (Weberbauer). Illustrated, Trans. Linn. Soc. Bot. 1: 25, *pl. 6*.

Cajamarca: Near Tomependa, *Bonpland*, type. Valley of the Río Marañón, mouth of Río Chinchipe, 400 meters, *Weberbauer 6217; 6226*. Between Jaën and Bellavista, *Weberbauer 6209a*. Also southern Bolivia to northern Argentina.

6. MYOSOTIS [Dill.] L.

In Peru usually a semi-prostrate or ascending simple or branched annual, sometimes more enduring, conspicuously pubescent with soft broadly oblanceolate leaves becoming bractiform above, and small blue flowers, corolla lobes contorted in the bud. Filaments filiform, nutlets 4, erect, ellipsoid, lustrous with a basal areola. Stigma disciform.—*M. virginica* (L.) BSP. of North America with small (1–2 mm. wide) flowers in a very hispid bilabiate calyx has been found in Argentina (Johnston, Contr. Gray Herb. 75: 42. 1925).

The "no-me-olvides" of South American gardens is the following species.

Myosotis azorica H. C. Wats. Bot. Mag. 70: *pl. 4122*. 1844; 28.

Stems becoming numerous, elongate, the hispid villous indument retrorse especially toward the base; lower leaves often several cm. long, 1–2 cm. wide or wider; racemes solitary or geminate, bractless, at least above; calyx densely strigose and also with spreading uncinate trichomes slightly but obviously irregular, the erect lanceolate lobes longer than the tube, the lower one the longest; corolla 5–7 mm.

broad; nutlets black, dorsally convex, the face strongly angled and keeled.—There are several older but still obscure names that are probably synonymous (Johnston).

Peru: Cultivated and probably escaped, at least in the vicinity of gardens.

7. MORITZIA DC.

Reference: Johnston, Contr. Gray Herb. 78: 17–20. 1927.

Hispid to strigose perennials, the alternate leaves tufted at base, the upper reduced, the blue flowers in bractless usually forked unilateral spikes or racemes. Calyx narrowly lobed, accrescent in age, the ribs uncinately pubescent. Corolla tube cylindric with spreading imbricate obtuse lobes, the throat with pubescent intruded appendages or spots. Stamens affixed above middle, filiform, stigma bilobed. Ovules 4. Nutlets solitary, erect, ovoid, abruptly contracted below with small areola at base of the strong ventral keel, the gynobase flat.

Moritzia Lindenii (A. DC.) Benth. Nat. Pflanzenfam. 4, Abt. 3: 121. 1894. *Meratia Lindenii* A. DC. Prodr. 10: 104. 1846.

Heavy caudex clothed with dead leaf bases and topped with many long-decurrent leaves, these greatly reduced and sessile on the one or two arcuate-ascending stems; indument lax or more or less appressed, pilose-hispid, dense especially on the leaves beneath, these narrowly oblong-obovate, the basal to 2 dm. long, to 2.5 cm. wide, those of the stems 4–6 cm. long, 0.5–2 cm. wide or the uppermost below the dichotomous branched inflorescences much reduced, all with anastomosing veins; inflorescences in fruit to about 7 cm. long and wide; calyces at least lower (2–7 mm. long) shortly pedicellate, hispid with callus-based trichomes, the lobes narrowly ovate, acuminate, 2.5 mm. long; corolla 4.5 mm. long, campanulate, the tube barely exserted, lobes rounded, about 2 mm. broad, sparsely short-hispidulous; style 1–2 mm. long; stamens just included or visible; nutlet white, tuberculate-muricate.

Piura: Huancabamba, *Weberbauer 6081*. Colombia; Venezuela.

8. LITHOSPERMUM L.

Reference: Johnston, Contr. Gray Herb. 70: 18–31. 1924; 78: 6–11. 1927; Journ. Arnold Arb. 33: 299–366. 1952.

Perennial or rarely annual, the yellow-orange or white flowers sometimes heterostyled; never spotted, the corolla throat more or less glanduliferous, sometimes with intruding appendages, the corolla tube rarely pubescent. Nectary weak or well developed. Style simple with two stigmas. Stamens whorled in the corolla tube, the globose cylindric ellipsoidal more or less ovoid pollen often somewhat constricted medially, with 6–9 pores in one row at or below the middle of the grain or near one end. Nutlets usually smooth, white, lustrous.—After Johnston, 312, not including *Arnebia* species of Asia and Africa, which he notes differ sharply only in the nature of the pollen, this cylindric or constricted medially with a row of 4 or 5 pores at each end. In this connection it may be remarked that characters of pollen unaccompanied by significant morphological distinctions have not been found important in the classification of the Convolvulaceae or Gentianaceae except by a few botanists. Johnston in his last work gave a detailed description including much original comment and observation; see also Brand, Repert. Sp. Nov. 28: 10–17. 1930, for a key to the American species.

Corolla greenish-yellow; calyx in fruit 5–8 mm. long.

Stem indument appressed; corolla villous, to 18 mm. long. *L. Macbridei.*

Stem indument lax; corolla hispidulous, 2.5 cm. long. *L. cinerascens.*

Corolla white; calyx short.

Stems prostrate, hispidulous..... *L. peruvianum.*

Stems spreading, early tufted, closely strigose..... *L. Gayanum.*

Lithospermum cinerascens (A. DC.) Johnst. Contr. Gray Herb. 75: 40. 1925; 8. *Macromeria cinerascens* A. DC. Prodr. 10: 69. 1846.

Stems about 2.5 dm. long, canescent with loosely appressed or spreading hispid indument, the crowded lanceolate acute leaves somewhat bulbous-pustulate, 1.5–2.5 cm. long, 4–6 mm. wide, sessile and rounded at base, the midrib prominent beneath, the margins slightly involute; racemes bracteate, few-flowered; pedicels 3 mm. long, slender; calyx lobes narrowly linear, acute, appressed hispidulous, 5–8 mm. long; corolla yellowish, tubular, a little contracted near base, hispidulous, 2.5–3.5 cm. long, the spreading lobes about 3 mm. long; nutlets ovoid, white, lustrous, sparsely punctate, 3 mm.

long; style very long, slender, subexserted.—After Johnston, from original description and photo.

Amazonas: Chachapoyas, (*Mathews*, type).

Lithospermum Gayanum (Wedd.) Johnst. Contr. Gray Herb. 78: 10. 1927. *Eritrichium Gayanum* Wedd. Chlor. Andina 2: 88. 1859. *L. andinum* Krause, Bot. Jahrb. 37: 636. 1906. *L. Shepardae* Johnst. Contr. Gray Herb. 78: 10. 1927, fide Johnston.

Stout-rooted, more or less ashy strigose, the procumbent or ascending stems often branched, 3–12 cm. long; leaves lanceolate to spathulate-obovate, subobtuse or acute, about 0.5–2 cm. long, 1.5–4 mm. wide, subcoriaceous, often short-hispid or obscurely pustulate; racemes foliose-bracteate; pedicels very short; calyx lobes oblong or linear, the longer white corolla 3.5–6 mm. long, the tube 2.5–3 mm. long with rounded spreading lobes 2–2.5 mm. long; throat appendages pubescent, oblong; nutlets 4 or fewer, ovoid, 2–2.3 mm. long, lustrous, about as long as the style and calyx lobes.—Most closely related to *L. distichum* Ortega of Mexico, but differs in its smaller stature, focal appendages merely puberulent swellings, glands few, none at base of filaments and the style without bilobate sterile tip (Johnston). F.M. Neg. 17354 (*L. andinum*).

Junín: Near Tarma, *Weberbauer 2396* (type, *L. andinum*). North of Yauli, 3,500 meters, *Stork & Horton 10885* (det. Standley, *L. Macbridei*).—Cuzco: Andes of Cusco, *Gay*, type.—Puno: Rocky clay puna, Chuquibambilla, 4,000 meters, *Pennell 13357; Mexia 04195*. Near Puno, 3,750 meters, *Mrs. Reid S. Shepard 114* (type, *L. Shepardae*). Saxaihuamán, (*Herrera 2208*). Northern Bolivia.

Lithospermum Macbridei Johnst. Contr. Gray Herb. 78: 8. 1927; 355.

A little shrub with many simple erect branches 2–6 dm. high, shortly and often densely ashy-strigose as also the leaves and calyces; leaves narrowly lanceolate or oblanceolate, acute or obtuse, 2–5 cm. long, 4–6 mm. wide, crowded, strict, the midnerve prominent; racemes terminal, few-flowered, bracteate; calyx 4–5 mm. long, in fruit 5–6 mm. long, the pedicels about 1 cm. long, falcate; corolla tubular, 15–18 mm. long, the attenuate cylindric tube 3–4 mm. thick, exceeding the calyx by about 1 cm., glabrous within, villous-strigose without, the divaricate or recurved lobes orbicular, 2.5–3 mm. long; throat very obscurely puberulent without appendages; stamens from above middle of tube, the filaments shorter than the linear anthers;

nutlets ovoid, white, lustrous, 2.8–3.2 mm. long, included; style elongate, subfiliform.—Closely related to *L. viride* Green of Mexico but with many smaller narrow veinless leaves and a pallid strigose indument; corolla greenish-yellow with a conspicuous subcylindric tube 10–14 mm. long and a small limb and diverging or recurving lobes; throat with no intrusions but with many glands, especially below each corolla lobe; nectary represented by 5–10 villulose swellings; style finally exserted 2–5 mm. with 2 stigmas; pollen subglobose or subspherical, 16–20 μ in diameter with rounded or slightly angulate sides and 8 obscure pores on the equator; mature fruiting calyx 5–8 mm. long, at most only twice as long as the nutlet (Johnston, l.c. 355, additional characters in contrast to *L. viride*).

Huánuco: Densely shrubby slope, Yanahuanca, 3,000 meters, *1185*, type. Grassy slope, Mito, *1592*. Llata, 2,100 meters, *2253*.

Lithospermum peruvianum A. DC. Prodr. 10: 77. 1846; 11. *L. aequatoriale* Brand, Repert. Sp. Nov. 28: 14. 1930, fide Johnston.

A hispid perennial, ligneous at base; leaves linear, acute, 1.2–3 cm. long, 2–4 mm. wide, tuberculate, pustulate; racemes few-flowered, leafy-bracted; calyx appressed pubescent, the linear lobes acute; corolla 4 mm. long, appressed pilosulous without, funnelform above the middle, the two scarcely surpassing the calyx, the lobes ovate, obtuse, the throat with pubescent rounded appendages above the anthers; nutlets usually solitary, ovoid, 2 mm. long, white, lustrous, punctate.—Stems many, slender, elongate, hispidulous; leaves crowded, 1.5–2.5 cm. long; inflorescence not sharply defined, the white flowers disposed toward the end of the elongate leafy stems; corolla tube stout, 1.5–2 mm. long, scarcely or not longer than calyx, the limb 3–4 mm. across, its broad rounded lobes nearly as long as the tube; throat with 5 circular glanduliferous areas, the nectary villose; style 1–2 mm. long with 2 juxtaposed terminal stigmas; pollen cylindric to ellipsoidal, the pores usually obscure (Johnston, l.c.). F.M. Negs. 27082; 17352 (*L. aequatoriale*).

Amazonas: Chachapoyas, *Mathews*, type. Ecuador.

9. AMSINCKIA Lehm.

Reference: Johnston, Contr. Gray Herb. 78: 98–100. 1927; Brand, Pflanzenreich IV. 252: 204–217. 1931.

Rather harshly pubescent erect annuals with alternate obscurely veined leaves and merely basally bracted (if at all) much elongating

racemes of orange to yellowish flowers. Calyx lobes erect. Corolla tubular-salverform, the cylindrical tube as throat unappendaged, the included stamens subsessile in the tube. Nutlets 4, erect on the well-developed gynobase, angulate-ovoid, not edged, ventrally carinate; areola medial, small, carunculate.—Constitutes a subtribe by reason of the biparted cotyledons. See Ray and Chisaki, Amer. Journ. Bot. 44: 529–554. 1957, for a detailed discussion of the occurrence and nature of heterostyly in the genus and its cytogenetics and phylogeny. Named after Wilhelm Amsinck, early nineteenth century mayor of Hamburg, a founder of the botanical garden.

Amsinckia hispida (R. & P.) Johnst. Contr. Gray Herb. 73: 75. 1924; 99. *Lithospermum hispidum* R. & P. Fl. Peruv. 2: 5. 1799. *A. angustifolia* Lehm. Delect. Sem. Hamb. Hort. 7. 1831. *Plagiobothrys aurantiacus* Brand, Repert. Sp. Nov. 20: 46. 1924, fide Johnston. *A. aurantiaca* Brand, Pflanzenreich IV. 252: 208. 1931.

Erect, more vigorous individuals attaining several dm., simple or openly branched, long-hispid-hirsute, above finely villous toward tip; lower leaves often approximate, oblanceolate, 5–15 (–18) cm. long, 5–15 (–24) mm. wide, cauline, linear-lanceolate, gradually reduced, all acute; racemes solitary or geminate, sometimes bracted at base, elongating and in age lax, 1–2.5 dm. long; calyx rather tawny, hirsute and somewhat hispid-villous, finally 4–6 mm. long, the lobes acuminate- or lanceolate-linear; pedicels ascending, 1–3 mm. long; corolla 3–7 mm. long, style as long as tube; nutlets triangular-ovate, angulate, incurved, 2–2.8 mm. long, granulate-tuberculate, commonly with strong irregular transverse crests, dorsally obtuse and the medial ridge frequently cristate longitudinally.—After Johnston who gives complete synonymy. *A. tessellata* Gray of western North America has been collected in Chile and Argentina, probably as a weed; the corolla is 6.5–7.5 mm. long, the nutlets tessellate, 3–3.5 mm. long. F.M. Negs. 17355 (*A. aurantiaca*); 17356 (*A. Mandonii*); 17357 (*A. marginata*).

Lima: Río Blanco, *729; 2968*. Chicla, (*Ball*). Near Cheuchin, *Ruiz & Pavón* (type, *L. hispidum*).—Huánuco: Llata, *2288*.—Cuzco: Paucartambo, *Herrera 1006a*.—Arequipa: Mollendo, *Weberbauer 1522* (type, *P. aurantiacus*). Ecuador to Chile and Argentina.

10. PLAGIOBOTHRYS Fisch. & Mey.

Reference: Johnston, Contr. Gray Herb. 78: 75–97. 1927; Brand, Pflanzenreich IV. 252: 105–114. 1931.

Hispid, erect, the crowded not obviously opposite lower leaves forming a rosette, the remaining obviously alternate. Calyx rarely parted at base. Gynobase with 4 lateral depressions, pyramidal. Nutlet scar more or less central.—Corolla appendages or swellings more or less obvious. See Johnston, l.c. 68: 57–80. 1923, for a discussion of the genus; he concludes that it correctly should be drawn to include *Allocarya* Greene, a premise not accepted by Abrams and others but perhaps an equally feasible disposition.

Plagiobothrys myosotoides (Lehm.) Brand, Pflanzenreich IV. 252: 108. 1931. *Lithospermum myosotoides* Lehm. Pl. Asperif. 319. 1818. *P. tinctorius* (R. & P.) Gray, Proc. Am. Acad. 20: 283. 1885; 80. *L. tinctorium* R. & P. Fl. Peruv. 2: 4, *pl. 114.* 1799, not L.

Erect, often a dm. or two high, the slender branching stems from a somewhat persisting rosette of oblong-linear to oblanceolate subobtuse leaves 1–4 cm. long, 1–4 mm. wide, the similar stem leaves alternate, more or less extending as bracts into the finally laxly flowered solitary or geminate racemes; calyx rather tawny, the erect or openly connivent lanceolate lobes finally 1.5–2.5 mm. long, shortly exceeded by the corolla tube, the corolla limb 1–2.5 mm. broad; nutlets broadly ovate, rounded at base, constricted below tip, 1–1.5 mm. long, granulate, stoutly carinate dorsally and laterally crested, acutely, sometimes reticulately ridged or also variously papillate or muriculate; scar inframedial in the broad transverse ventral groove slightly lower than the well-developed ventral keel.—After Johnston, who remarks that the Peruvian plants seem to be the same as the typical state from central Chile. Plants suffused with a dye that stains drying specimen papers.

Lima: Matucana, *Weberbauer 5724.*—Arequipa: Volcan El Chachani, 4,000 meters, *Pennell 13279; Bailey.* Chile; California.

11. ALLOCARYA Greene

References: Johnston, Contr. Gray Herb. 78: 98–101. 1927; Brand, Pflanzenreich IV. 252: 159–182. 1931.

Similar to *Plagiobothrys* but more commonly prostrate, rarely erect, and the leaves, including the more or less remote lower, clearly opposite and never forming a rosette. Calyx divided to base. Corolla without appendages. Gynobase conical with 4 triangular depressions. Nutlets carinate entire length of inner face.—Brand, l.c., considered all the Peruvian plants forms of one species, *A. humilis*

(R. & P.) Greene, and indeed the apparent differences may be shown, eventually, to be merely variations.

Conservatively and monographically, in work where the primary purpose of classification is concerned with relationship, these little plants, in spite of their reasonably homogeneous facies, perhaps would be most intelligently treated as comprising a section of *Plagiobothrys*, as by Johnston, but realistically, which is to say, floristically and more conveniently, they are distinguishable as a closely allied but separate group as by the illustrious Abrams, Brand, and many other able students. Brand's discussion, l.c. 17, is pertinent here, while his quotation of Graebner is apropos for any number of similar circumstances in classification. Unfortunately many of Brand's judgments are questionable in view of the unevenness of his work, especially in drawing generic lines; here for example he considers *Allocarya* itself as divisible generically instead of sectionally in order to express the apparent specific relationships. *Plagiobothrys plurisepalus* (F. v. Muell.) Johnst. l.c. 81: 75. 1928 if an *Allocarya* will make advisable the conservation of the latter name against *Maccoya* F. v. Muell., 1859; cf. Brand, l.c.

Perennials; nutlets rugose or ridged.

Style well-exserted from mature nutlets; flowers axillary or pseudoscapose.....*A. Kunthii.*

Style at most as long as nutlets; flowers in bracteate racemes.

Calyx tips reddish; leaves greenish.....*A. humilis.*

Calyx tips obscurely flavescent; leaves canescent..*A. pygmaea.*

Annual; nutlets not rugulose.....*A. Macbridei.*

Allocarya humilis (R. & P.) Greene, Pittonia 1: 17. 1887; 84. *Myosotis humilis* R. & P. Fl. Peruv. 2: 5. 1799. *Plagiobothrys humilis* (R. & P.) Johnst. Contr. Gray Herb. 68: 75. 1923.

Glabrescent or sparsely strigose perennial (calyx appressed villosulous) with prostrate or often ascending stems, usually rooting at lower nodes; leaves linear, widened at base, rounded at apex, 2–6 cm. long or longer, 1.5–3 mm. wide, sometimes only ciliate; racemes irregular, alternate bracted, finally very open, elongating to 9 cm.; pedicels to 1 mm. long; calyx canescent, the erect lanceolate lobes tawny pubescent above, 2.5–3.5 mm. long; corolla white, the limb 1–2 mm. across; nutlets ovate, acute, 1–1.5 mm. long, granulate, unevenly reticulate-ridged, definitely carinate only above the middle, scar suprabasal; style at most equaling nutlets.—Described as a hispid

annual, no doubt by error. Young or poorly developed plants with glomerate racemes among the leaves; simulate *A. congestus* typically at least with canescent indument. Characteristically begins to flower in wet often stony soils.

Ancash: Catuc, east of Huaraz, 3,000 meters, *2510*.—Lima: East of Canta, *Pennell 14640*. Matucana, 2,400 meters, *459*. Near Chicla, *Ball*. Banos, (*Wilkes Exped.*).—Huánuco: Pillao, *Ruiz & Pavón*, type. Pampayacu, *Sawada 94*.—Junín: La Quinua, 3,600 meters, *2013*.—Apurímac: Chincheros, *Stork & Horton 10745* (det. Standley). Ampuy, *Goodspeed Exped. 10631* (det. Standley); *Vargas 515* (det. Standley, *Cryptantha granulosa*).—Cuzco: La Raya, 4,300 meters, *Pennell 13504*. Marcapata, *Vargas 9712* (det. Standley). Quispicanchis, *Vargas 920* (det. Standley, *Cryptantha granulosa*). Sicuani, (*Hicken*).—Moquegua: Carumas, *Weberbauer 7325a*. Bolivia.

Allocarya Kunthii (Walp.) Macbr. Field Mus. Bot. 4: 119. 1927. *Anchusa Kunthii* Walp. Nov. Act. Caes. Leop. Nat. Cur. 19. suppl. 372. 1843. *A. linifolia* (Lehm.) Macbr. var. *Kunthii* (Walp.) Macbr. Proc. Am. Acad. 51: 545. 1916. *Antiphytum Walpersii* A. DC. Prodr. 10: 122. 1846. *Eritrichium Walpersii* (A. DC.) Wedd. Chlor. And. 2: 90. 1859. *Plagiobothrys Kunthii* (Walp.) Johnst. Contr. Gray Herb. 68: 74. 1923; 83.

Perennial, cespitose-tufted or the more or less developed repent stems rooting at the nodes and forming mats; leaves crowded toward base, linear, subobtuse, 1–2.5 cm. long, to 1 mm. wide, sparsely appressed hispid-villous and ciliate, thin at dilated base; flowers solitary, apparently scapose in stemless plants from the congested leaves, otherwise in the axils of the stem leaves; calyx slightly villosulous, rounded in fruit, the narrow lobes 2–4 mm. long, the stout pedicels 3–6 mm. long; corolla white with yellowish appendages, tube 3–3.5 mm. long, limb 4–6 mm. broad; nutlets ovate, acute, 1.4–1.8 mm. long, coarsely reticulate-rugose at least above the middle, ridges often spiculate, medial keel definite toward apex, areola suprabasal; style much longer than nutlets.—This follows Johnston's interpretation and is probably correct, but, as he remarks, type not seen.

Puno: Low pampa, Lake Titicaca, (*Shepard 4*). Granja Modelo de Chuquibambilla, *Mexia 04185*. Adjacent Bolivia to Ecuador. "Sillo-sillo" (Mexia).

Allocarya Macbridei (Johnst.) Ferreyra, comb. nov. *Plagiobothrys Macbridei* Johnst. Contr. Gray Herb. 78: 88. 1927.

Prostrate or laxly ascending annual with many slender minutely appressed villous stems 3–several cm. long; leaves linear, little dilated toward base, subacute, sparsely hispid-villous; racemes lax, regularly bracted, the linear bracts 0.5–2 cm. long; calyx appressed villous, finally 2–2.5 mm. long including the erect lanceolate lobes; corolla subtubular, about 1 mm. wide; nutlets ovate, about 1.5 mm. long, somewhat angled, irregularly tuberculate or papillate, very obscurely carinate; areola suprabasal, large, more or less excavated.—Clearly related to the Chilean *A. procumbens* (Colla) Greene but lacking transverse ridges (Johnston). Doctor Ramón Ferreyra, the distinguished Peruvian botanist, has kindly transferred this interesting species to which our friend assigned my name. Brand included this in *A. humilis* (R. & P.) Greene, but it is probably distinct.

Lima: In short grass, Viso near Matucana, 2,700 meters, *599*, type.

Allocarya pygmaea (HBK.) Macbr. Field Mus. Bot. 4: 119. 1927. *Anchusa pygmaea* HBK. Nov. Gen. & Sp. 3: 92. 1818. *Eritrichium humilis* (R. & P.) A. DC., var. *congestum* Wedd. Chlor. And. 2: 88. 1859. *Plagiobothrys congestus* (Wedd.) Johnst. Contr. Gray Herb. 68: 75. 1923.

Resembles *A. humilis* but not so coarse, canescently hispid-villous, at least the leaves which usually exceed the ordinarily glomerate racemes, these 1–3 cm. long, leafy-bracted; calyx canescent or at most flavescent.—*Amsinckia humifusa* [Poeppig] Walp. Nov. Act. Caes. Leop. Nat. Cur. 19. suppl. 371. 1843, essentially a nomen nudum, probably belongs here in part (Johnston). F.M. Neg. 32969.

Arequipa: Chiray, 3,900 meters, *Weberbauer 6889*.—Puno: Chuquibambilla, *Pennell 13397*. Occa Pampa, 3,700 meters, (*Shepard 107*).—Moquequa: Carumas, 4,000 meters, *Weberbauer 7325*. To Argentina.

12. CRYPTANTHA Lehm.

References: Johnston, Contr. Gray Herb. 74: 1–114. 1925; l.c. 78: 30–74. 1927.

Peruvian species (at least) erect slender hispidulous annuals, one (*C. parviflora*) not producing cleistogamous flowers, all with opposite basal leaves and inconspicuous white flowers in bracted or bractless racemes. Calyx parted basally. Nutlets usually 4, laterally affixed

by a medially, often basally dilated groove to a more or less pyramidal gynobase and somewhat enclosed in the mature calyx.—Brand disagreed with Johnston in application of some names, especially as to *C. parviflora* (Phil.) Reiche, which he restricted to Chile; the careful and thoughtful later student saw the type as well as several Chilean and Peruvian collections.

Nutlets thin-margined, dissimilar; spikes not bracted or only at base. *C. parviflora.*

Nutlets obtusely if at all margined; spikes bracted except *C. peruviana.*

Corolla showy, to 7 mm. wide; style scarcely or not exserted. *C. varians, C. granulosa.*

Corolla 0.5–1.5 (2) mm. wide; style longer than nutlets.

Calyx in fruit 3–4 mm. long, narrow lobes suberect to tips. *C. filaginea.*

Calyx in fruit 5–6 mm. long, broad lobes spreading at tips. *C. limensis.*

Corolla to 1.5 mm. wide; style barely longer than nutlets. *C. peruviana.*

Cryptantha filaginea (Phil.) Reiche, Anal. Univ. Chile 121: 829. 1908; 46. *Eritrichium filagineum* Phil. l.c. 90: 536. 1895.

A dm. or two tall, the basally or apically branched slender stems finely strigose and hispid, the leaves linear or lanceolate, obtuse, 1–2.5 (–3) cm. long, 1–2 mm. wide, pustulate, finely short-hispid; spikes solitary or geminate with caducous linear bracts 3–6 mm. long; fruiting calyx oblong, 3–4 mm. long, usually crowded, sessile, readily deciduous, the lobes finally linear, appressed short hispid below, hirsute on prominent midrib, above slightly pubescent; corolla white, narrow, rarely 2 mm. broad; nutlets usually 4, nearly alike, the axial one most persistent, tuberculate, usually obscurely granulate, 1.2–1.8 mm. long, acute, angled, often margined, the narrow or closed groove forked at base; style much longer than nutlets, the gynobase a third to a fourth shorter.—An old plant, probably *C. parviflora,* with the type, possibly suggested the name (Johnston).

Arequipa: Mollendo hills, *Johnston 6280; Hitchcock 22384.* Chile.

Cryptantha granulosa (R. & P.) Johnst. Contr. Gray Herb. 68: 54. 1923; 44. *Myosotis granulosa* R. & P. Fl. Peruv. 2: 5. 1799. *C. latifolia* Johnst. l.c. 73: 73. 1924, fide author.

A few cm. to 3 dm. tall, the stems often laxly branched, finely more or less appressed hispid; leaves sessile, linear to oblong, 2–3.5 cm. long, 2–4 or rarely 5–10 mm. wide, sparsely pustulose-setose; spikes solitary or geminate, 3–12 cm. long, the few to many bracts 3–5 (–10) mm. long; fruiting calyx subsessile, ovate, 2–4 mm. long, mature lobes linear or lance-linear, obtuse, sparsely appressed hispid, but short-hirsute on midrib below; corolla about 5 mm. long, 4–4.5 mm. across at tip; nutlets 4, alike or the axial subpersistent one slightly the largest, 1.3–1.8 mm. long, tuberculate or papillate and somewhat glandular, rounded or obtuse at base, acute, angled, groove closed or dilated basally; gynobase to three-fourths length of nutlets, about equaling the style.—After Johnston, who decided his *C. latifolia* was a luxuriant phase of the species; Brand described the throat glands as oculiform. Illustrated, Pflanzenreich IV. 252: 66, *fig. 4.*

Lima: Chancay, *Ruiz & Pavón*, type; *Stork & Vargas 9350.* Mt. San Augustín near Lima, *Weberbauer 5695.* Chorillos, near Lima, *5861* (type, *C. latifolia*). Near Mala, *Vargas 9320.*—Arequipa: Mollendo, (*Hitchcock 22357*); *Johnston 3532(?)*; *Mexia 04181; Worth & Morrison 15765* and east of Chala, *15611.* Near Atiquipa, *Worth & Morrison 15653.*

Cryptantha limensis (A. DC.) Johnst. Contr. Gray Herb. 70: 46. 1924; 48. *Eritrichium limense* A. DC. Prodr. 10: 133. 1846. *C. Macbridei* Johnst. l.c. 73: 74. 1924. *C. Woitschachii* Brand, Repert. Sp. Nov. 20: 317. 1924.

Finely appressed hispid, sometimes a dm. or so tall, the oblong-lanceolate subobtuse leaves more or less pustulate, 1–3 cm. long, 2–4 mm. wide; spikes solitary or geminate, 3–5 cm. long; fruiting calyx subsessile, ovate-oblong, 5–6 mm. long, the finally linear to oblanceolate lobes very hirsute below on midrib, the herbaceous spreading upper part merely hispid; corolla subtubular, about a mm. wide; nutlets 4, alike or nearly, truncate at base, acute, angled, tuberculate, 1.5–1.7 mm. long, the groove dilating into a suprabasal triangular areola; axial nutlet the most firmly set, now and then the largest, the gynobase about three-fifths as high, the style longer.—After Johnston (as determinations) who concluded that both recently proposed species are clearly synonyms.

Lima: Stony slopes, Chorillos, *5869* (type, *C. Macbridei*). San Augustín base, *Weberbauer 5693.* Barranca, *Worth & Morrison 9107; Weberbauer 5700* (this and preceding det. Brand *C. granulosa;* col-

lections may be mixed). Near Lima, *Abadia*, type.—Arequipa: In and on edge of fertile belt, Mollendo, *Johnston 3531*. North of Mollendo, *Worth & Morrison 15474*. Without data, (*Woitschach*, type, *C. Woitschachii*).

Cryptantha parviflora (Phil.) Reiche, Anal. Univ. Chile 121: 821. 1908; 39. *Eritrichium parviflorum* Phil. Fl. Atac. 39. 1860. *C. piscoensis* Brand, Repert. Sp. Nov. 20: 49. 1924. *C. umbelliformis* Brand, l.c. 317, fide Johnston. *C. Seleri* Brand, l.c.

Slender, usually with a single stem laxly branched from near base, sometimes about 2 dm. tall, more or less appressed canescent hispid and often also with few short-hispid trichomes; leaves linear, mostly 1–4 cm. long, 1–2 mm. wide, appressed hispid or spreading short hirsute, somewhat pustulate beneath, the upper early rather obscurely; solitary or geminate spikes, these many, 1–5 cm. long, bractless or with one bract at base; fruiting calyx ovate or oblong-ovate, 1.5–2 mm. long, sessile, readily deciduous, the mature calyx lobes lanceolate-oblong, connivent, densely short hirsute; corolla 0.3–0.5 mm. broad; nutlets usually 4, clearly different, ovate or triangular-ovate, tuberculate or muricate, acute, rounded at base, dorsally convex, the edges sharply margined, the groove at least below dilated into a shallow triangular areola; odd nutlets abaxial, largest and most persistent about 1 mm. long, the consimilar ones 0.6–0.8 mm. long, readily deciduous; gynobase about two-thirds height of odd nutlet, the style much surpassing the latter.—Johnston saw no authentic material of *C. Seleri* but assumed it to be the hispid plant collected by Pennell and *C. umbelliformis* to be a young state of this, while *C. piscoensis* with appressed pubescence is a somewhat coarser form collected at Quive by Pennell. He remarked the close relationship of this species to the North American *C. angustifolia* (Torr.) Greene and *C. Grayi* (V. & R.) Macbr., resembling the former in nutlets, the latter in aspect and measurements.

Lima: Quive, *Pennell 14300*. Near Chosica, *Weberbauer 5337* (type, *C. umbelliformis*).—Ica: Above Pisco, 1,200 meters, *Weberbauer 5375* (type, *C. piscoensis*).—Arequipa: Tingo, *Pennell 13112*. Above Arequipa, *Pennell 13177*. Yura, (*Born*).—Moquegua: Southwest of Moquegua, *Weberbauer 7398a*. Chile.

Cryptantha peruviana Johnst. Contr. Gray Herb. 73: 74. 1924; 50. *C. Weberbaueri* Brand, Repert. Sp. Nov. 20: 318. 1924 and *C. cajabambensis* Brand, l.c. 319, fide Johnston. *C. debilis* (Phil.)

Reiche var. *peruviana* (Johnst.) Brand, Pflanzenreich IV. 252: 49. 1931.

Short-hispid, sometimes long-branched, slender, often a dm. or two tall, the many obscurely pustulate linear leaves 1–3 (–6) cm. long, 1–2 mm. wide; spikes solitary or geminate, early congested, finally to 5 cm. long, bractless; fruiting calyx subsessile, ovate, 2.5–3 mm. long, the narrowly lanceolate lobes erect, appressed hispid-villous, somewhat hirsute along the midrib; corolla subtubular, the limb 0.8–1.4 mm. wide; nutlets 4 or fewer, alike, the subpersistent axial one always present, all lanceolate-ovate, acute, 1.5–1.8 mm. long, coarsely muricate or also rugose, granulate, acute at edges, the groove closed or basally dilated; style barely exceeding nutlets, the gynobase about three-fifths as long.—Closely related to *C. globulifera* (Clos) Reiche of Chile and Argentina with fruiting calyces 3–4 mm. long, the lobes connivent above with somewhat spreading tips (Johnston); stems stouter, leaves a little longer, var. *peruviana* according to Brand. I have not seen *C. debilis*, described as decumbent-ascending, nutlets 4, transverse-rugose—data contrary to Brand's conclusion.

Ancash: Hacienda Cajabamba between Samanco and Huaraz, (*Weberbauer 3041*, type, *C. cajabambensis*). Rocky places, 3,200 meters, Ocros, (*Weberbauer 2658*, type, *C. Weberbaueri*).—Lima: Rocky slope, 3,600 meters, Río Blanco, *674*, type.—Arequipa: In gravel along streams, base of El Misti, *Pennell 13235*. El Chachani, *Hinckley 77*.—Moquegua: Open mixed formation, Tocata, 2,200 meters, *Weberbauer 7398*. Chile?

Cryptantha varians Brand, Repert. Sp. Nov. 24: 57. 1927.

Erect, slender, branched and lightly hispid with rather long somewhat spreading trichomes; leaves linear, 2–4 cm. long, 2–3 mm. wide; terminal spikes elongating, sometimes sparsely bracted by reduced leaves; sepals oblong, obtuse, 2 mm. long; corolla to 3.5 mm. long, 4 mm. across at tip; throat glands semilunate; gynobase subulate, little shorter than the fruiting setose-hispid calyx, this 2.5 mm. long; nutlets 1–3, ovoid, acute, 1.25 mm. long, brown, densely whitish granulate, the groove at base divaricately forked.—Referred by Johnston to *C. granulosa* (R. & P.) Johnst. but perhaps distinguished by the smaller flowers, more pubescent calyx, and fewer nutlets—differences of course that may be shown to be variable by study of sufficient collections.

Lima: Rocky outcrop north of Chosica, *Weberbauer 5340*, type.

13. HACKELIA Opiz.

References: Johnston, Contr. Gray Herb. 68: 43–48. 1923; Brand, Pflanzenreich IV. 252. 1931.

Herbs, ordinarily biennial or perennial with broad veiny alternate leaves and flowers in paniculately disposed racemes, inconspicuously or not bracted, the pedicels slender, finally recurving. Calyx basally parted, the divisions spreading. Corolla lobes rounded, imbricate, the throat with trapeziform intruded glanduliform appendages. Stamens medially affixed, included, the short filaments slender, the anthers slender to elliptic. Style slender, scarcely or not surpassing the 4 nutlets, these erect, ovate, affixed ventrally to a pyramidal gynobase by a broad medial areola, marginally glochidiate with frequently basally confluent appendages, dorsally smooth.—Commemorates a German professor, Josef Hackel, of the early nineteenth century, who shared the lively interest of his botanical friends.

KEY (after Brand)

Nutlets similar; throat glands subquadrate; calyx 3, corolla 6 mm. long, blue to violet.....*H. andicola.*

Nutlets dissimilar; throat glands semilunate; corolla white or pale.

Corolla inconspicuous, tinted to white; glands trifid at base. *H. parviflora.*

Corolla showy, white; glands subentire.....*H. revoluta.*

Hackelia andicola (Krause) Brand, Pflanzenreich IV. 252: 120. 1931. *Cynoglossum andicolum* Krause, Bot. Jahrb. 37: 635. 1906.

Stems ascending-erect, more or less white hispid as the long petioles of the lower lanceolate leaves, these 6–8 cm. long, to 12 mm. wide, puberulent-hirsutulous but green, herbaceous, reduced upward, finally sessile, nearly oblong; racemes short, forming a narrow panicle; pedicels about 1 mm. long; calyx white hispidulous and ciliate, 3 mm. long; corolla subrotate with short tube, 6 mm. long, 8.5 mm. wide; throat glands yellow, papillose, subquadrate; nutlets similar, the body as the appendages about 3 mm. long; the scar triangular, small.—In part after Brand; the group needs revision with much material; if the flower and fruiting characters are constant it may be distinct. *H. mexicana* (Cham. & Schlecht.) Johnst. seems to be similar but the nutlets are said to be dissimilar, the aculei long and

short as those of *H. revoluta;* it has been found as near as Ecuador. F.M. Neg. 49606.

Cajamarca: Toward Hualgayoc, 4,100 meters, (*Weberbauer 4230*, type).

Hackelia parviflora (Krause) Brand, Pflanzenreich IV. 252: 122. 1931. *Cynoglossum parviflorum* Krause, Bot. Jahrb. 37: 634. 1906.

Type slender, weakly erect, puberulent hispidulous-pilose; basal or lower leaves elliptic or ovate-elliptic, petioles to 5 mm. long, the gradually reduced upper ones sessile, subovate, all acute, the largest 5 cm. long, 2 cm. wide; racemes short, terminal, lax; pedicels 1–1.5 mm. long; calyx densely strigose, 2 mm. long, lobes lanceolate, slightly longer than the glabrous corolla tube, this shorter than the rounded corolla lobes; throat glands puberulent, unevenly curved or bilobate at base; nutlets dissimilar, the largest 3 mm. long without the appendages, 2 minute (Brand).—See remark under *H. andicola.* Illustrated, Brand, l.c. 121, *fig. 13* (opened flower). F.M. Neg. 17358.

Junín: Between Tarma and La Oroya, 3,700 meters, (*Weberbauer 2520*, type).

Hackelia revoluta (R. & P.) Johnst. Contr. Gray Herb. n. ser. 68: 45. 1923. *Cynoglossum revolutum* R. & P. Fl. Peruv. 2: 6. 1799. *Lappula revoluta* (R. & P.) Brand, Repert. Sp. Nov. 14: 148. 1915. *C. ovatifolium* Griseb. Goetting. Abhandl. 24: 271. 1879, fide Brand. *C. Fiebrigii* Krause, Bot. Jahrb. 37: 634. 1906, fide Brand.

Becoming perennial from a rhizome, the 1–few rather stout stems often several dm. tall, branched above, more or less hispidulous-pilosulous as the petioles and calyces; leaves typically oblong- or ovate-elliptic (petioles of lower to 1.5 dm. long), not greatly reduced upward, all acute, green but appressed puberulent-hispid, those on the stems mostly 5–10 cm. long, 2–4 cm. wide except the sessile uppermost on the lax flowering branchlets; racemes short; recurving fruiting pedicels nearly equaling the calyces, these with oblong segments 3 mm. long; corolla campanulate, about 5 mm. long, lobes and tube subequal; throat glands large, subquadrate; nutlets dissimilar, 2 long-glochidiate, 2.5 mm. long, 2 very shortly appendaged (Brand). —F.M. Neg. 17359.

Johnston, l.c., included here the proposed Bolivian species of Krause but apparently with some reservation on the ground of insufficient materials; the problem seems to concern the constancy and significance of the apparent differences, which are certainly slight;

actually there may be only one species—variable—extending from Mexico to Argentina. The following specimens are referred here as determined, without consideration of Brand's characters. Forma *ovatifolia* (Griseb.) Brand and f. *Fiebrigii* (Krause) Brand refer to the obvious intangible variation in leaf-form, the latter including individuals with more lanceolate leaves, mostly 5–15 mm. wide.

Lima: San Juan de Chicla toward Puente de Anchi, (*Weberbauer 207*, det. Brand; 169).—Junín: Huassahuassi, *Ruiz & Pavón*, type. Near Yauli, 3,500 meters, *Stork & Horton 10880* (det. Standley). Near Huancayo, *Soukup 3990*.—Apurímac: Chincheros, *Stork & Horton 10744* (det. Standley). Prov. Canas, 3,725 meters, *Vargas 11038* (det. Standley); *50* (det. Brand). Saxaihuamán, *Herrera 2203*. Hacienda Ayusbamba, *Vargas 901* (det. Standley). Prov. Anta, *Herrera 3630; 3631*. Northward in the Andes from Argentina.

14. PECTOCARYA DC.

Reference: Johnston, Contr. Gray Herb. 70: 34–39. 1924.

Ascending to erect annual herbs with linear and opposite lower leaves. Flowers leafy-bracted, borne on most of the stems or branches. Calyx basally divided, accrescent. Corolla tubular, the small imbricate lobes ascending, the throat with intruded appendages. Stamens affixed at middle of tube, the anthers oblong or elliptical. Nutlets 4, obovate to linear, divaricate, geminate, uncinately pubescent, affixed apically to a low broadly pyramidal gynobase.—After Johnston who remarks: a very distinct genus.

Nutlets subulately fringed dorsally as marginally.....*P. gracilis.*
Nutlets smooth dorsally.....*P. lateriflora.*

Pectocarya gracilis Johnst. Contr. Gray Herb. 70: 36. 1924; 115.

Stems finely strigose, erect or ascending, leaves filiform, linear, 1–3 cm. long, 0.7–1 mm. wide, appressed hispid-villous; flowers all chasmogamic; corolla short, salverform; nutlets densely pubescent, the short soft trichomes uncinate; body of nutlet obovate-oblong, 1.5–1.7 mm. long, about 7 mm. broad without a proper margin but the back and upper sides with subulate subterete appendages 0.6–1 mm. long, these ending in uncinately tipped bristles.—Apparently related to *P. lateriflora* but distinctive by the peculiar nutlike appendages (Johnston).

Arequipa: Sandy pampa, El Chachani, 2,400 meters, *Hinckley 41*, type. Above Arequipa, *Pennell 13165*. "Estrella gatevdora."

Pectocarya lateriflora (Lam.) DC. Prodr. 10: 120. 1846; 117. *Cynoglossum lateriflorum* Lam. Encycl. 2: 239. 1786. *C. pilosum* R. & P. Fl. Peruv. 2: 6, *pl. 111b.* 1799. *C. lineare* R. & P. l.c. *P. linearis* (R. & P.) DC. Prodr. 10: 120. 1846.

Stems finely appressed, hispid-villous or strigose; leaves filiform to linear-lanceolate, 1–5 mm. long, 1–2.5 mm. wide, usually attenuate both ends, ordinarily somewhat canescently appressed hispid-villous; flowers all chasmogamic; corolla short salverform; nutlets usually not identical, the abaxial one usually more pubescent and roughened, the others commonly smooth and glabrate or sparsely pubescent; nutlet body obovate or slightly oblong, 2–2.5 mm. long, 1–1.8 mm. broad with a definite medial dorsal ridge and finally a well-developed spreading margin, pectinately and lacerately cleft or divided into subulate or triangular teeth that terminate in uncinately tipped bristles.—After Johnston (as other descriptions), who remarks: characterized by its obovate definitely margined nutlets and rather coarse stems and leaves; a plant of the lomas and desert margins.

Lima: Huara, *Ruiz & Pavón.* Amancaës, 200 meters, *Pennell 14806.* Atocongo, 400 meters, *Pennell 14791.* Canta, 2,800 meters, *Pennell 14583.* Obragillo, *Wilkes Exped.* Río Blanco, 3,600 meters, *675.* San Geronimo, 150 meters, *5907.* Near Chosica, *Weberbauer 5330.*—Arequipa: Atiquipa, *Worth & Morrison 15654.* Mollendo, *Johnston 3534; Hitchcock 22382.*—Moquegua: Open mixed formation, *Weberbauer 7396.* Ecuador.

VERBENACEAE Endl. Verbena Family

Avicenniaceae included expediently; Moldenke, Phytologia 7: 123 et seq. 1960.

Herbs, shrubs or trees commonly with opposite or verticillate (rarely alternate) leaves, simple except *Vitex* (in Peru), and variously disposed but usually hermaphrodite gamopetalous flowers, the calyx persisting, rarely with separate segments, the corolla sometimes more or less zygomorphic, the tube ordinarily well developed. Stamens 4, in 2 pairs, or 2, sometimes unequal in length; again, only 2 fertile. Ovary superior, not lobed or parted, 2–4 (10) -celled or in *Duranta* 4-carpellate, 8-celled, becoming drupaceous or subcapsular (in *Avicennia* capsular), finally often separating into achene-like nutlets or pyrenes. Style terminal, single, entire or the stigma 2 (4–5) -parted.

In so far as this account of the species found to date (1955) in Peru is complete, thanks are due to the extraordinary industry of

Harold Norman Moldenke as indicated by the records published by him since 1934. But it has been difficult to compile intelligently from his descriptive work because usually it lacks indication of characters peculiar to the plant described or its apparent relationship; sometimes discussions of the latter have been promised in monographs in preparation; *Aegiphila, Petrea, Vitex* and a few small genera have been monographed by him to date (1959). Furthermore, individual peculiarities often are obscured in the monotony of detailed diagnosis of characters common to related forms. This bespeaks the almost infinite patience of the observer but questionably advances knowledge or favors its dissemination in reviews like this, for identification.

The family obviously is closely knit or reticulate in living character-development; the generic key therefore is difficult to use and, like Moldenke's, is after former students, especially the most recent one, Briquet. A simpler key could be devised if number of stamens and number of nutlets were found not sound indicators of related groups. *Basistemon* Turcz. once referred here belongs to the Scrophulariaceae (see Moldenke, Pennell, Bull. Torrey Club 63: 348. 1936). Avicenniaceae Endl. may properly be a family according to the informative and well-presented data assembled by Moldenke, Phytologia 7: 135–139. 1960.

Teak (*Tectona grandis* L. f.) of southern Asia is of course the outstanding member of the family; Moldenke, Phytologia 1: 154–164. 1935; 5: 112–120, 134–142. 1955, compiled an encyclopedic account of this beautiful and valuable tree. Species that have added to man's esthetic well-being include the colorful Verbena mats and Lantana hedges, many Peruvian.

Inflorescence simple or narrowly paniculate, sometimes short or capitate or condensed spikes, sometimes extended, branched or panicled; plants (Peru) often semiherbaceous and (or) low.

Fruit splitting into 4 (rarely fewer) nutlets (pyrenes).

Stamens 4; calyx not or little accrescent.....1. *Verbena.*

Stamens 2; calyx in fruit basally wider.....2. *Hierobotana.*

Fruit splitting into 2 nutlets.

Nutlets 1-celled, 1-seeded; calyx not inflated.

Calyx not or little longer than wide; stamens (fertile) 4.

Calyx truncate; teeth more or less obscure; fruit somewhat soft.....3. *Lantana.*

Calyx 2–4-cleft or dentate; fruit dry, firm.....4. *Lippia.*

Calyx clearly longer than wide, narrow, costate.
Stamens 4.....5. *Bouchea.*
Stamens 2.....6. *Stachytarpheta.*
Nutlets 2-celled, 2-seeded; calyx inflated or accrescent.
Nutlets echinate; plants pilose.....7. *Priva.*
Nutlets rugulose; plants glabrescent.....8. *Castelia.*
Inflorescence more or less compound (sometimes reduced), or simple and (or) axillary; plants commonly at least in age shrubby, lianas or arborescent.
Flowers variously disposed but not characteristically cymose.
Fruit with 2 united 1-seeded nutlets; flowers racemose; calyx showy.....9. *Petrea.*
Fruit with 2 or 4 nutlets, these 2–several-seeded; calyx small.
Calyx distinct from fruit; racemes often few-flowered.
Nutlets 2.....10. *Citharexylum.*
Nutlets 4.....11. *Duranta.*
Calyx merged with fruit; racemes few-flowered.
12. *Rhaphithamnus.*
Flowers cymose or cymose-paniculate at least characteristically (inflorescence rarely reduced, axillary).
Flowers more or less zygomorphic; stamens 4, or 2 fertile.
Drupe with 4 unparted nutlets; bracts showy..13. *Amasonia.*
Drupe with 1 nutlet.
Leaves simple; fertile stamens 2.....14. *Cornutia.*
Leaves normally compound; fertile stamens 4...15. *Vitex.*
Drupe 4-parted with 4 or fewer nutlets; stamens 4, long-exserted.....16. *Clerodendrum.*
Flowers regular; stamens alike, 4 or 5.
Calyx subentire to lobed; drupe (often dry) with 2–4 nutlets.
Calyx not accrescent.....17. *Callicarpa.*
Calyx accrescent.....18. *Aegiphila.*
Calyx with nearly free imbricate segments; capsule tomentose, 1-seeded.....19. *Avicennia.*

1. VERBENA L.

Glandularia Gmelin, Syst. 2: 920. 1791. *Junellia* Mold. Lilloa 5: 392. 1940.

References: Schauer in DC. Prodr. 11: 522–700. 1847; Perry, Ann. Mo. Bot. Gard. 20: 239–362. 1933; Schnack & Covas, Darwiniana 6: 469–476. 1944.

Herbs or more or less suffrutescent, generally diffuse or even decumbent, matted or tufted, rarely glabrous. Leaves seldom verticillate, sometimes imbricate, small or rarely scale-like, alternate, entire or variously incised. Flowers in elongate to capitate spikes or these rarely reduced, 1–few-flowered, usually terminal; bracts ordinarily narrow; corollas mostly small but sometimes colorful, funnelform to salverform, sub-bilabiate. Calyx 5-costate, slightly if at all accrescent. Stamens 4, didynamous, the anthers now and then appendaged, sometimes vestigially, the cells rarely slightly diverging. Ovary 4-celled, ovules solitary, lateral just above base. Fruit dry with 4 finally separating nutlets.

For confirmation of my impression that *Junellia* Mold., a group name for several small alpine more or less depressed ligneous species, is correctly a part of *Verbena*, representing merely an ecological condition, see Troncoso, Darwiniana 8: 487. 1949, who showed that habit varies and that anthers here may be appendaged; compare, too, *Phyla* under *Lippia*. On the other hand there may be a natural relationship within the scope of *Glandularia* as defined by Schnack and Covas, l.c., but since their conclusion was based on relatively few species and neither they nor apparently other students have followed up their work after more than a decade the soundness of the segregation is certainly open to question; Schauer was probably right in grouping the glandular-tipped anthered species as a section. However, here may be recorded Schnack and Covas observations: *Verbena* restricted to species with funnelform corollas, various tones of purple, rarely white; style at most three times longer than ovary; anther cells equal to or smaller than connective, the appendages glandular; inflorescence nearly always a terminal panicle of spikes; stem parenchyma in 4 interrupted bands; chromosomes small with basic number 7 or multiple. *Glandularia* was defined: corollas salverform, colors various; style much longer than ovary; anther cells exceeding connective, the 2 upper anthers with prominent, vestigial gland or none; inflorescence simple or branched generally once; cortical parenchyma continuous, not interrupted at the angles (below inflorescence); chromosomes large with basic number $n=5$, $yn=15$. These characters were illustrated, l.c., for *V. officinalis* L. and for *G. laciniata* (L.) Schnack & Covas. Perry, l.c. *pl. 13*, showed transverse sections of the fruit of *V. Wrightii* Gray and *V. bracteata* Lag.

& Rodr. to illustrate the subtrigonous shape of the latter in contrast to the subcylindric form of *V. Wrightii*, this representing section *Glandularia*. It may be noted that in other families as in the related Boraginaceae chromosome count alone may not be taxonomically conclusive. Incidentally, Schnack and Covas have merely implied transfers to *Glandularia*, as source of specific publication has not been indicated.

Lily M. Perry's revision of the North American species, while applicable directly to only a few Peruvian plants, has been most helpful because of her concise and clearly contrasting presentation of salient as well as less important characteristics, these not lost or concealed in irrelevant verbosity or repetitive phraseology.

Finally may be mentioned Moldenke's Hybridity in the Verbenaceae, Am. Midl. Nat. 59: 333–370. 1958 with bibliography; possibly in Peru occurs among other hybrids × *V. Bealei* Mold. (l.c. 342), and Phytologia 2: 129–151. 1946 (*V. hispida* × *V. litoralis*).

Leaves or segments subulate or minute, usually pungent, rigid; depressed shrubs except *V. juniperina*.

Plants forming compact polsters; leaves minute..... *V. minima*.

Plants not polster-forming or at least not as above.

Subpulvinate shrub; minute leaves obtuse..... *V. aretioides*.

Laxly or intricately branched shrub; leaves or segments pungent. *V. juniperina*.

Leaves not subulate nor rigid nor pungent; not depressed shrubs or not compactly, unless *V. villifolia*, *V. Weberbaueri*.

Leaves 3-divided nearly to base, rarely in part entire or bifurcate.

Leaves closely canescent strigillose-hispidulous.

Segments entire or bifurcate..... *V. calcicola*.

Segments dissected..... *V. lucanensis*.

Leaves more or less canescent hirsute-villous-strigose. *V. fasciculata*, *V. clavata*.

Leaves lightly hispidulous, greenish.

Branches villous; shrubby in age..... *V. fissa*.

Branches puberulent, rather herbaceous.

Leaf segments hirsute, incised..... *V. Ferreyrae*.

Leaf segments entire or 1–3-lobed..... *V. variabilis*.

Leaves more or less trifid but obviously cuneate-based or petiolately narrowed, the segments variously serrate to pinnate or

dissected, rather entire (cf. *V. lucanensis*). See third contrast below.

Compact, branches short, ligneous; leaves shortly lobed, villous. *V. villifolia.*

Diffuse, decumbent ascending, often ligneous toward base.

Primary leaf segments often closely pinnately lobed or dissected and narrowly in varying degree.

Leaves mostly or all shorter than 1 cm.....*V. microphylla.*

Leaves mostly or all larger. *V. tenuisecta, V. dissecta, V. laciniata.*

Primary leaf segments typically sparsely pinnately incised to coarsely serrate.

Leaf segments broad, very cuneate-based. *V. trifida, V. cuneifolia.*

Leaf segments narrow, alate petiolate or subsessile. *V. Matthewsii, V. pogonostoma.*

Primary leaf segments entire, bifid or trifid.....*V. occulta.*

Leaves variously cleft or serrate to entire, sometimes 3-lobed.

Leaves at most to about 3 times longer than wide, more or less cuneate-based, unevenly incised or lobulate, rarely entire.

Leaves entire.

Bracts subulate; corolla yellow or tube red; calyx teeth unequal.....*V. aspera.*

Bracts rhomboid; corolla pale azure; calyx teeth equal. *V. Echegarayi.*

Leaves never entire.

Flowers conspicuous, yellow, scarlet or in part red-purple, except *V. Tessmannii.*

Corolla not lilac.

Leaves coarsely serrate-crenate.....*V. peruviana.*

Leaves somewhat pinnate or trifid or only incised. *V. Berterii.*

Corolla lilac.....*V. Tessmannii.*

Flowers often lilac, purple or white, scarcely showy (3–7 mm. long) unless *V. occulta.*

Leaves not at all connate (ex char.).

Spreading or depressed, suffruticose, matted in age.

Spikes often subfastigiate; leaves incised. *V. Hayekii.*

Spikes cylindric; leaves in part 3-lobulate. *V. Weberbaueri.*

Erect or arcuate-ascending perennial or weedy; stems 4-angled. . . . . *V. parvula, V. officinalis.*

Leaves slightly connate basally.

Leaves entire below, medially 3-lobed. . . . . *V. occulta.*

Leaves, at least typically, unevenly serrate or cleft. *V. hispida.*

Leaves usually much longer than wide, oblong to lanceolate but often attenuate to base.

Leaves at least slightly connate.

Stems subterete; spikes often 2–several cm. long, hispid, glandular. . . . . *V. hispida.*

Stems acutely angled; spikes to about 1 cm. long, hispidulous. . . . . *V. bonariensis.*

Leaves attenuate to subsessile or petiolar base; stems angled.

Spikes little elongating but sometimes open below in fruit, cymose or subpanicled. . . . . *V. brasiliensis.*

Spikes soon elongating and open at least below, often simple.

Leaves coarsely crenate-serrate.

Plants more or less pubescent. . *V. litoralis, V. carolina.*

Plants glabrate or essentially glabrous. . . . *V. glabrata.*

Leaves pinnately incised, cleft or lobulate. . *V. officinalis.*

Verbena aretioides Hayek, Bot. Jahrb. 42: 163. 1908, not R. E. Fries, Nov. Act. Soc. Sci. Upsala ser. 4, 1, no. 1: 109. 1905. *Junellia Hayekii* Mold. Lilloa 5: 396. 1940.

A small subpulvinate shrub, the short branches prostrate, the ligneous trunk about 5 mm. thick, the young branchlets densely short-pubescent as the minute opposite basally connate imbricate leaves, these cuneate-oblong, in part entire, in part 3-lobed, obtuse, carinate; heads terminal, 1–3-flowered, the oblong pubescent bracts little shorter than the calyx, this strigose, angled, 3 mm. long; corolla glabrous, the tube scarcely exserted; anthers not appendaged.—Extraordinary in the partly entire, partly 3-lobed leaves; flowers larger than those of the related *V. Philippiana* Ktze. and similar species (author); on the other hand it is the same as *V. calcicola* Walp. according to Johnston. F.M. Neg. 17402.

Puno: Tacora to Pomarape, *Stuebel 100b*, type.

Verbena aspera Gill. & Hook. in Hook. Bot. Misc. 1: 163. 1829; 544. *Junellia aspera* (Gill. & Hook.) Mold. Lilloa 5: 393. 1940.

Shrubby, the branches rigid or virgate, the younger spreading, subherbaceous, pilose-hirtellous; leaves alternate or often proliferous-fasciculate, oblong-elliptic or subspathulate, acute, somewhat substrigose-hirtellous both sides; spikes 2, densely, soon laxly imbricate, a dm. long or longer, sessile, pubescent, the subulate bracts nearly as long as the tubular calyx, 5 mm. long with 4 very unequal subulate-acuminate teeth; corolla glabrous, the slender curved tube well-exserted, the limb 5-parted; nutlets 4, at first united.—The elongate corolla is subcernuous, yellow (Pennell) or lobes yellow, tube reddish (Eyerdam).

Ancash: (Moldenke).—Ayacucho: Huacata, 3,000 meters, *Weberbauer 5779* (det. Johnston).—Arequipa: Near Arequipa, *Pennell 13187; (Meyen); Eyerdam & Beetle 22121.* Chachani, (*Hinckley 54*). Chile; Argentina.

Verbena Berterii (Meisn.) Schauer in DC. Prodr. 11: 551. 1847. *Shuttleworthia Berterii* Meisn. Gen. Pl. Comment. 198. 1839.

Suffruticose, the procumbent tetragonal branches ascending, canescent-hirsutulous as the calyces, these to 8 mm. long; leaves strigose-hispidulous, pinnatifid or trifid, the intermediate division tridentate, entire at attenuate base, the linear-lanceolate segments subacute, revolute; spikes capitate, many-flowered; bracts linear-lanceolate, about 3 mm. long; corolla 2.5–4 cm. long, the tube more or less pubescent above, limb large, throat villous; connective appendages dorsal, scarcely exserted or exceeding anther tips, continuous to base; calyx contorted over the fruit of 4 nutlets, these striatulate, reticulate-rugose apically.—Differs from the Brazilian *V. tenera* Spreng. and the Chilean *Glandularia sulfurea* (D. Don) Schnack & Covas in the pubescent corolla, also from the former in leaves, from the latter in sessile appendages. Annual or perennial herb, corolla red-purple, limb bluish-lavender (Metcalf).

Junín: (*Moldenke*).—Huancavelica: Near Córdova, *Metcalf 30267.* —Ayacucho: Puquio to Lucanas, 3,200 meters, *Metcalf 30322.* Chile.

Verbena bonariensis L. Sp. Pl. 1: 20. 1753; 541; (Perry, 254).

Tall, acutely tetragonal stems asperous-hispidulous; leaves more or less subconnate and subcordate, the lower cuneate-oblong, lanceolate, coarsely serrate, scabrous-hirsute both sides, nerves prominent

beneath, spikes short, subcylindrical by the crowded flowers, long-peduncled in dense terminal cymes; bractlets subulate-lanceolate, acuminate, hirtellous and ciliate, slightly if at all longer than the hispidulous-angled calyx, this 3 mm. long, cleft after closing over the short fruit; corolla slightly exserted, blue, violet or purple, finely villous; nutlets about 2 mm. long, subreticulate apically, muricate-scabrous.—The related *V. rigida* Spreng. or var. *rigida* (Spreng.) Ktze., to be expected, has glandular inflorescences, bractlets and corolla tube longer than calyx; probably more correctly classified as a variant as at least the glandular character varies in other specific entities. Said to be an introduction in Peru.

Lima: Botanical Garden, *Soukup 2911*.—Arequipa: Near Arequipa, *Raimondi*. North of Paraguay, Argentina, Brazil.

Verbena brasiliensis Vell. Fl. Flum. 17. 1825; Icones 1: *pl. 40*. 1827; 542. *V. litoralis* HBK. var. *pycnostachya* Schauer in DC. Prodr. 11: 542. 1847; var. *brasiliensis* (Vell.) Briq. Ann. Cons. Jard. Bot. Genève 7–8: 292. 1904. *V. approximata* Briq. l.c., fide Moldenke; cf. *V. litoralis* HBK. below, recognized by Perry.

Vigorous erect perennial to 2 meters tall, conspicuously 4-angled; leaves distant, cuneate at base, lower obovate, upper lanceolate, acuminate, acutely incised-serrate; cyme open, compound, the long branches linear-lanceolate, foliate; spikes fascicled at the tips, in fruit 2–5 cm. long; calyx pubescent; corolla small, purple; nutlets trigonous, about 2 mm. long, striate, apically reticulate.

Cajamarca, Libertad, Huánuco, Junín, Cuzco (Moldenke). To Paraguay.

Verbena calcicola Walp. Nov. Act. Acad. Nat. Cur. 19, suppl. 1: 378. 1843; 550. *V. gynobasis* Wedd. Chlor. And. 2: 156. 1857, fide Johnston.

Herbaceous or scarcely suffruticose, canescent hirtellous (or strigillose) all over, the stems decumbent, the branches ascending; leaves sessile, usually parted to base into 3 obtuse linear revolute segments or entire, rarely bifurcate, 1–1.5 cm. long; spikes terminal, shortly peduncled, after anthesis ovate, in fruit to 1.5 cm. long; bracts linear, about as long as the 5-cleft calyx, its lobes linear, 4–5 mm. long; corolla reddish, half again longer than calyx, limb to 1 cm. across, the rounded lobes subemarginate; anther connective unappendaged, ovary 4-lobulate even to middle; one stigma horned and smooth, other branches obtuse and papillose.—Included by Schauer in *V. cla-*

vata R. & P. and conceivably it may be an ecological condition. F.M. Neg. 17409.

Cuzco: (*Gay*).—Arequipa: Near Arequipa, *Meyen*, type. Mollendo, *Weberbauer 1455*.—Moquegua: Torata, *Weberbauer 7464* (det. Johnston). Tacora, on road from Tacora to La Paz, (*Weddell*, type, *V. gynobasis*).

Verbena carolina L. Syst. ed. 10, 852. 1758–1759; (Perry 268). *V. polystachya* HBK. Nov. Gen. & Sp. 2: 274. 1818, fide Perry. *V. caroliniana* L. (sic) forma vel var. *polystachya* (HBK.) Loes. Repert. Sp. Nov. 9: 362. 1911.

Stems usually solitary and erect, branched, hirsute; leaves subsessile or attenuate into a short petiole, lanceolate-oblong or somewhat elliptic-oblong, to 8 cm. long or sometimes longer, subobtuse or acute, coarsely crenate-serrate, strigose-pustulate above, hirsute-strigose, especially in the venation, beneath; spikes in panicles, slender, open in fruit; bracts ovate, acuminate-subulate, ciliate, to about half as long as the hispidulous calyx, this in fruit 2 mm. long, the obtuse mucronate lobes connivent; corolla tube scarcely exserted, the limb about 2 mm. across; nutlets trigonous, dorsally convex, striatulate, the commissural faces nearly smooth, meeting at right angles.

Lima: Atocongo, *Pennell 14770* (det. Johnston).—Junín: Huancayo, *Soukup 3182*. To Arizona.

Verbena clavata R. & P. Fl. Peruv. 1: 21, *pl. 33, fig. b.* 1798; 550.

Canescently strigose-hirsute all over, suffruticose, the many branches ascending; leaves sessile, 3-parted nearly to base, 6–8 mm. long, the divaricate oblong-clavate segments quasi-verticillate, entire, revolute or 2–3-cleft; spikes sessile in the uppermost leaves, capitate, many-flowered; bracts lanceolate, subequaling the calyx, this 6 mm. long, unequally 5 plicate-subulate, dentate, both cinereous hirsute; corolla purplish, tube strigose above, about 9 mm. long, the throat pubescent, the linear-oblong lobes emarginate; anther appendages exserted, clavate, stipitate, arcuate-divergent.—Var. *casmensis* Mold., Phyt. 4: 58. 1952, has scarcely revolute leaves mostly drying blackish, about 3 mm. wide, with short unevenly spreading twisted trichomes both sides; flowers lilac, fragrant. Leaves resemble those of *V. trifida;* spreading pubescence differs from both plants. Forma *albiflora* Mold. was first noted formally from *Ferreyra 2507*.

Ancash: Near Huaraz, *Sandeman 4611*. Lomas de Casma, (*Ferreyra 8031*, type var.). Lomas de Mongón, *Goodspeed 9184*.—Arequipa: Near Islay, *Isern 2477*. Mollendo, *West 8202; Eyerdam 25159; Mexia 04170; Goodspeed Exped. 15719*.—Moquegua: Tacora, *Isern 2478*.—Tacna: Candarave, *Metcalf 30374*. *Ruiz & Pavón*, (*Tafalla*), type. Chile. "Tacpa" (Mexia).

Verbena cuneifolia R. & P. Fl. Peruv. 1: 22, *pl. 32*. 1798; 539.

Stems erect, tetragonal, hispid, subsimple or corymbose above; leaves broadly ovate, at base cuneate, sessile, strigose-hispid on both sides, 5 cm. long, nearly as wide, deeply 3-cleft and laciniate, the lanceolate segments acutely incised pinnatifid or coarsely serrate; spikes subternate, terminal, oblong, finally cylindric, about 2.5 cm. long, canescent and glandular; bracts lanceolate, about 5 mm. long; calyx subulately 5-lobed, becoming constricted over the fruit, nearly 8 mm. long; corolla blue, the tube somewhat funnelform, about 10 mm. long, pubescent above; nutlets reticulate-tuberculate above. —F.M. Neg. 17411.

La Libertad: (Moldenke).—Ancash: Cayabamba, *Weberbauer 3060*. Pomabamba, Huaraz, *Raimondi*.—San Martín: Moyobamba, *Ruiz & Pavón*, type.—Huánuco: Yanahuanca, *1210*.—Junín: Acopalca, *Stork 10920; Soukup 3537*. Huancayo, near Huancayo, *Soukup 3970; Raimondi*.—Huancavelica: Tayacaya, *Raimondi*.—Ayacucho: (*Moldenke*).—Cuzco: Valle del Paucartambo, *Herrera 1409*. Chile. "China-verbena."

Verbena dissecta Willd. ex Schauer in DC. Prodr. 11: 552. 1847. *Glandularia dissecta* (Willd.) Schnack & Covas, Darwiniana 6: 475. 1944.

Early decumbent canescent hirsutulous annual, the subterete branchlets erect; leaves cuneately decurrent into petioles, 3-parted, pinnatifid or laciniate, the linear subobtuse segments entire or dentate, subrevolute, strigose above, hirsute beneath; spikes terminal and axillary, fastigiate, the flowers spreading, cymose-paniculate; bracts oblong, acute, much shorter than calyx, this 8 mm. long, the unequal teeth subulate-aristate, hirsute and shortly stipitate glandular, glabrate in the intervals; corolla violet, subexserted as the anther appendages.—Compare *V. laciniata* (L.) Briq., of which, perhaps, it is correctly a part.

Puno: Pisacoma, (*Meyen*). To Uruguay. Chile; Bolivia; Brazil.

Verbena Echegarayi Hieron. Bol. Acad. Nut. Córdoba 4: 66. 1881. *Junellia Echegarayi* (Hieron.) Mold. Lilloa 5: 395. 1940.

Similar to *V. aspera;* spreading older branches prominently nodose, the younger hirtellous and with alternate leaves and short axillary branchlets of fasciculate ones, the lower leaves oblong-lanceolate or subspathulate, subobtuse, the upper cordate-lanceolate, mucronulate, mostly 5–8 mm. long, 1.5–3 mm. wide, sparsely hirtellous; spikes 2–7 cm. long; bracts rhomboid, subacuminate-mucronate, 4.5 mm. long, 1.5 mm. wide, ciliate, glabrate or sparsely hirtellous; calyx slightly hirtellous, 5 mm. long, the 4 teeth equal; corolla pale azure, the tube 8 mm. long, the segments subdenticulate or emarginate.—Otherwise like the related species, ex char. for which I am indebted (as often previously) to the librarian of Arnold-Gray Herbarium, Mrs. L. Schwarten.

Arequipa: Airampul, Arequipa to Puno, *Weberbauer 1396* (det. Moldenke). Argentina.

Verbena fasciculata Benth. Bot. Voy. Sulphur 153. 1844.

Apparently suffrutescent, ascending-erect, very hirsute, to several dm. tall; leaves sessile, 3–5-parted to base, the younger fascicled in axils, the lanceolate or linear segments entire or 3–5-parted, the larger divisions to 5 cm. long, 4 mm. wide, the others smaller and much narrower, all acute; spikes sessile or shortly peduncled, dense, the lanceolate-subulate bracts equaling the costate hirsute calyx, this with setaceous teeth and little exceeded by the corolla tube; anther cells distinct; upper style lobe very short, thickly pulvinate-stigmatose, the slightly longer lower lobe naked, incurved-acute; nutlets rugose.—Type collected by Hinds at "Huamantango," probably Huamantamba near Canta, Lima, which is in the scope of Cuming's brief visit.

Peru: On the coast, (*Cuming 954*, fide Bentham).

Verbena Ferreyrae Mold. Phytologia 3: 279. 1950.

Herb, the ascending-erect obtusely angled stems and branches more or less pubescent as the leaves (especially beneath); nodes annulate; leaves sessile, almost basally 3-parted, 3–6 cm. long and wide, the segments pinnately parted and incised, usually gradually widened toward base where often 8 mm. wide, revolute, the lobes acute, somewhat pilosulous above, glabrescent in age; inflorescence terminal, capitate in anthesis, 4 cm. long or longer later, the principal spikes usually ternate; peduncles 1.5–4 cm. long, retrorsely short-

pubescent; bractlets oblong-linear, 6–8 mm. long; calyx tubular, short-pubescent, 5-costate-apiculate, 6 mm. long; corolla sky-blue, tube 8 mm. long, limb about 9 mm. across, densely pilose in throat. —Author suggested no relationship in spite of the implied honor to a colleague.

Ayacucho: Puquio, Prov. Lucanas, 3,200 meters, (*Ferreyra 5491*, type).

Verbena fissa Hayek, Bot. Jahrb. 42: 165. 1908.

Small, shrubby, the branches densely and canescently villous; leaves opposite, 3-parted to base, the linear divisions about 2 mm. wide, obtuse, revolute, strigose-setose above, subsetose-tomentose beneath; spikes subcapitate, finally little elongate, the linear-lanceolate setose bracts subequaling calyx, this 5-angled, strigose, much longer than corolla-tube; corolla 1 mm. long, limb 4–6 mm. broad, lilac, fragrant.—Near *V. thymoides* Cham. but more depressed, more densely pubescent, larger flowers; as *V. calcicola* Walp., cited as a synonym in Index Kewensis, may also prove to be a variant of *V. clavata* R. & P. as suggested by Johnston. About 3 dm. tall, flowers white or pink, on middle and lower green slopes (Johnston). F.M. Neg. 17416.

Ancash: Below Ocros, *Weberbauer 2768*, type; 169. Hualas, *Raimondi*.—Arequipa: Posco, Cachendo, (*Guenther & Buchtien 133; 133a*). Mollendo, *Weberbauer 389;* 143, 147; *Johnston 3560*. Near Chala, *Ferreyra 5554* (det. Moldenke, *V. clavata*).—Tacna: Candarave, *Weberbauer 7385* (det. Johnston, *V. clavata*); *Metcalf 30374*.

Verbena glabrata HBK. Nov. Gen. & Sp. 2: 276. 1818; 542.

Glabrous or essentially except the hispidulous lanceolate-acuminate bracts and calyx; branches tetragonous; leaves oblong-lanceolate, cuneate to short petioles, incised serrate, prominently reticulate-veined beneath, about 5 cm. long or longer, 2 cm. wide; spikes ternate, filiform cylindric, the lateral long-peduncled, 2.5 cm. long, the intermediate longer; corolla roseate, tube little exserted.—To 1 meter tall, corolla tube red, blue-violet above, fruit red-maroon (Metcalf). Schauer says this is more compact, more glabrate than *V. litoralis* HBK. var. *pycnostachya* Schauer; compare *V. bonariensis* L., *V. brasiliensis* Vell.

Lima: (Moldenke).—Ayacucho: Puquio to Quebrada de San Antonio, 2,800 meters, *Metcalf 30294*.—Cuzco: (Moldenke). Venezuela; Ecuador.

Verbena Hayekii Mold. Phytologia 2: 148. 1946. *Junellia Hayekii* Mold. Lilloa 5: 396. 1940. *V. aretioides* Hayek, Bot. Jahrb. 42: 163. 1908, not R. E. Fr. 1905. *V. procumbens* Hayek, Bot. Jahrb. 42: 163. 1908, not Forsk.

Suffruticose, the elongate prostrate rooting branches glabrous, the erect short branchlets sparsely setose; leaves sessile, oblong-obovate, cuneate to base, coarsely incised dentate, strigose-hirsute both sides; spikes subfastigiate, often branched at base, finally cylindric, the ovate-lanceolate acute setose bracts subequaling the calyx, this angled, 5-dentate, 3 mm. long; corolla lilac, 6 or 7 mm. long; upper anthers unappendaged.—Near *V. Weberbaueri* but differs in the long rooting branches, longer flowers, different inflorescence (Hayek). Corolla white with lilac or pink lobes, pubescent in center (Stork & Horton). F.M. Neg. 17442.

Junín: La Oroya, 3,700 meters, *Weberbauer 2573*, type, 180; *Kalenborn 36; 176.*—Huancavelica: Near Huancavelica, *Stork & Horton 10820.*—Cuzco: (Moldenke).—Puno: (Moldenke). Bolivia?

Verbena hispida R. & P. Fl. Peruv. 1: 22, *pl. 34, fig. a.* 1798; 542.

Spreading-erect or ascending, the rigid branches pilose-hispid; leaves semiamplexicaul, oblong or lanceolate, cuneate to base, acuminate, coarsely and unevenly serrate or incised, subentire or bilobulate, lineate-rugose, strigose hispid on nerves both sides and also hirtellous beneath; spikes hispid and glandular, terminal, peduncled, often ternate, dense, cylindric, finally about 7 cm. long; bracts lanceolate, at least as long as the subulate-dentate calyx, this scarcely more than 2 mm. long; corolla tube about 4 mm. long.—Determinations mostly by Johnston; Raimondi, by Herb. Dahlem. F.M. Negs. 17555; 24686; 29686.

Cajamarca: Cascas, *Raimondi.*—San Martín: (Moldenke).—La Libertad: (Moldenke).—Lima: Canta, *Pennell 14582.* Near Lima, *Raimondi.*—Huánuco: Near Huánuco, *Ruiz & Pavón*, type. Mito, *1704.*—Junín: Tarma, *1006; Killip & Smith 21855; 21925.*—Huancavelica, *Stork & Horton 10820* (det. Standley).—Loreto: (Moldenke).—Arequipa: *Isern 165.*—Cuzco: Sicuani, (*Hicken*). Prov. de Cercado, *Herrera.* Cerro de Colquipata, *Pennell 14184.* Yucay, *Soukup 259.*—Puno: Chuquibambilla, *Pennell 13409.*—Moquegua: Tacora, *Isern 166.* Ecuador; Chile and Argentina.

Verbena juniperina Lag. Gen. & Sp. Nov. 19. 1816; 544. *Junellia juniperina* (Lag.) Mold. Lilloa 5: 396. 1940; var. *grisea* (Johnst.)

Mold. l.c. 397. *V. juniperina* Gill & Hook. in Hook. Bot. Misc. 1: 163. 1830.

Much branched pubescent shrub typically a meter or so high, the opposite persisting leaves deeply 3-parted, the segments acerose or spinose in age and then very rigid; heads terminal, the subulate bracts longer than the calyx, this about 6 mm. long, somewhat inflated, about half as long as the corolla tube.—New leaves spring from the axils of the old, the latter thus simulating stipular spines (Gillies and Hooker). The variant *grisea* Johnst., Contr. Gray Herb. 81: 96. 1928, was only 3–5 dm. high, canescent, the branchlets mostly represented by leaf-fascicles, rarely longer than 1 cm. A low very dense shrub of open rocky slopes, the flowers deep lavender (Pennell); purple with yellow spots (Metcalf).

Huancavelica: Córdova, *Metcalf 30268.*—Ayacucho: Parinacochos, *Raimondi.* Lucanas, *Raimondi.* Río de Lomas, 2,900 meters, *Weberbauer 5771.*—Arequipa: Misti, *Weberbauer 1392;* 130. Nevado Chachani, *Pennell 13259;* (*Hinckley 76,* type, var.).—Moquegua: Torata, 3,200 meters, *Weberbauer 7461* (var.).—Tacna: Near Candarave, *Metcalf 30388* (var.). Argentina. "Pomera."

Verbena laciniata (L.) Briq. Ann. Cons. Jard. Bot. Genève 7–8: 296. 1904; 552. *Erinus laciniatus* L. Sp. Pl. 630. 1753. *V. erinoides* Lam. Tabl. Encycl. 1: 57. 1791. *V. multifida* R. & P. Fl. Peruv. 1: 21, *pl. 33.* 1798. *Glandularia laciniata* (L.) Schnack & Covas, Darwiniana 6: 475. 1944.

Much branched, decumbent, the ascending branches rooting toward base, more or less strigose-hirsute especially on the nerves of the leaves beneath, the terminal or lateral pedunculate spikes canescent; leaves decurrent, cuneate at base, 3-parted, pinnately lobed or laciniate, spreading stellate-hirsutulous, the laciniae lanceolate-linear or widely subacute, entire or subdentate and subrevolute; spikes soon elongating and lax; bracts lanceolate, acuminate, spreading, often as long as calyx, this angulate, hirtellous and with some stiped glands, the subulate-aristate teeth finally connivent, to 8 mm. long, the corolla shortly exserted; anther appendages minute, subbarbate.—Type from Peru by Feuillée. Stems wiry, prostrate, forming loose mats to a meter or more wide, the odorless, clear, mauve to violet flowers in flattened heads to 5 cm. across (Balls); as interpreted, leaves trifid or much divided, the Linnaean plant was said to have scarlet flowers (Hooker); red-violet (Schauer). Illustrated, Darwiniana, l.c. 472, *fig. 1* (flower parts).

La Libertad: Río Negro, *West 8115.*—Lima: Río Blanco, *678* (det. Johnston); *Raimondi 10703; Killip & Smith 21754* (det. Standley); *Ferreyra 6502* (det. Moldenke).—Huánuco: Chinche near Yanahuanca, *1260.*—Junín: (*Moldenke*).—Cuzco: Ollantaitambo, *Herrera 3450; 3442; Pennell 13677.* Sicuani, (*Hicken*). Near Cuzco, (*Herrera 18*); *Vargas 241* (det. Standley). To Chile; Argentina; Brazil.

Verbena litoralis HBK. Nov. Gen. & Sp. 2: 276, *pl. 137.* 1818; 542. *V. bonariensis* L. var. *litoralis* (HBK.) Hook. Bot. Misc. 1: 166. 1830.

Rather similar to *V. bonariensis* but lightly strigillose; leaves scabrous above and lanceolate-oblong, attenuate to subsessile base; spikes more or less cymose or subpanicled; bracts ovate-lanceolate, at most about as long as the calyx, this 2–2.5 mm. long, subtruncate with minute teeth.—Hooker and Schauer added a "t" to the name; the former remarked, l.c.: seems to be a variety with shorter spikes than usual. Perry, Ann. Mo. Bot. Gard. 20: 257. 1933, retained it as distinct. Actually, most material referred here seems doubtfully distinct from *V. carolina* L. A common weed, only a few of many collections cited; authors gave Truxillo, Santa and Lima specimens as type collections.

Cajamarca: Truxillo, *Bonpland,* type; *Osgood & Anderson 36.*—Amazonas: Chachapoyas, *Williams 7534.*—San Martín: Tarapoto, *Williams 5911.* San Roque, *Williams 7087.*—Ancash, fide Moldenke.—Lima: Near Lima, *54.* Río Blanco, *Killip & Smith 21541.*—Huánuco: Mito, *1705.* Pillao, *Woytkowski 34175.*—Junín: Chanchamayo Valley, *Schunke 1724.*—Loreto: Iquitos, *Williams 7894.* Río Nanay, *Williams 1297.* Yurimaguas, *Williams 4367.*—Arequipa: Posco, Cachendo, (*Guenther & Buchtien 132,* det. Bruns).—Cuzco: Prov. Cercado, 3,350 meters, *Herrera 1505.* Valle del Urubamba, *Herrera 1664.* Valle del Paucartambo, *Herrera 3362.*—Tacna: (*Moldenke*). Uruguay and Chile to Central America. "Verbena del campo."

Verbena lucanensis Mold. Phytologia 3: 279. 1950.

Ex char. rather similar to *V. Ferreyrae;* branches as peduncles (4–15 mm. long) densely and divaricately short-pubescent; leaves 1–4 cm. long and wide, deeply 3-parted, leaf-segments densely puberulent both sides, deeply and irregularly dissected, to 2.5 mm. wide; inflorescence terminal and in the upper axils, to 3.5 cm. long; bractlets lanceolate, about 3 mm. long; calyx narrowly 5-dentate, 3–4 mm.

long; corolla purple, the tube 6–7 mm. long, puberulous above, the limb 6 mm. broad; calyx not inflated in fruit but 5-parted, the 4 cocci 2 mm. long, glabrous, lustrous, scrobiculate-ridged dorsally, the commisural surface white-papillose below the upper third.

Ayacucho: Nazca to Puquio, 1,500–2,000 meters, Prov. Lucanas, (*Ferreyra 5493*, type).

Verbena Matthewsii Briq. Ann. Cons. Jard. Bot. Genève 10: 104. 1907.

Tall, the stout erect stem obtusely 4-angled (branches in type few), spreading pilose (some shorter-stiped glandular trichomes intermixed) especially the leaves, these alate-petiolate or subsessile, deeply 3-parted, about 4 cm. long, the incised-crenate segments scarcely 0.5 mm. wide, the lobules obtuse; spikes terminal, at anthesis 2.5 cm. long, 1.5 cm. broad, elongating, the peduncles pubescent; bracts narrowly lanceolate, acuminate, 5–7 mm. long; calyx oblong, tube 5-angled, 5 mm. long, indument in part glandular, teeth lanceolate, acuminate, 2 mm. long; corolla tube exserted, 2–3 mm. long, the limb 5 mm. across, puberulent without, the obovate lobes sometimes subemarginate; gland of anthers small.—Neighbor of *V. Berterii* (Meisn.) Schauer and *V. clavata* R. & P. with procumbent branches, the former too with shorter bracts, the latter with 3-divided leaves, the segments pseudoverticillate (author).—Type was distributed as *V. laciniata* (L.) Briq. and doubtfully a distinct species but as here listed leaf-segments broader, in type seen acute but Lima and Huánuco specimens with more obtuse segments could be placed here. Species name here spelled with two *t's*, as it was sometimes spelled by the collector. F.M. Neg. 24691.

Cajamarca: Chota, *Stork & Horton 10032* (det. Standley, *V. laciniata*).—Ancash: Chacchán, *2539* (det. Johnston, *V. laciniata*).—Lima: Above Lima, *Mathews 498*, type. Lomas de Grenados, *Stork & Vargas 9341*.—Junín: Chamiseria to Acopalca, *Soukup 3537*(?).—Loreto: (Moldenke).—Ayacucho: Prov. Lucanas, 3,000 meters, *Ferreyra 5470* (det. Moldenke).

Verbena microphylla HBK. Nov. Gen. & Sp. 2: 272, *pl. 133*. 1818; 551.

Low or creeping, much branched, strigose-hispidulous or hirtellous; leaves subsessile, cuneate at base, 6–10 mm. long, 3-parted, the segments obovate-oblong, obtuse, revolute, entire or the medial trifid, the lateral bifid; spikes capitate, subsessile terminal and lateral, many-flowered; bracts lanceolate, shorter than the calyx, this 6 mm.

long, the short ovate teeth acute; corolla glabrous except pilose throat, the tube about 1 cm. long, the lobes emarginate; anther appendages black, corniculiform, equaling the throat; fruit half as long as calyx, the nutlets finely tuberculate dorsally.—Scarcely more than a part of *V. laciniata* (L.) Briq. but perhaps recognizable and apparently a high Andean state; listed by Ball as "*V. diffusa* Willd."

Ancash: Above Samanco, at Cajamba, 3,700 meters, *Weberbauer 3042;* 171.—Lima: Prov. Chancay, *Ferreyra 3531* (det. Moldenke). Above Lima, at Chicla, 3,420 meters, *Ball; Weberbauer 226;* 169.—Ayacucho: Puquio, Prov. Lucanas, *Ferreyra 5509* (det. Moldenke).—Cuzco: Sicuani, *Vargas 9827* (det. Standley).—Puno: Salcedo, *Soukup 70.* Orurillo, *Soukup 870.* Chuquibambilla, *Pennell 13359* (det. Johnston). Sta. Lucia, *J. Sharpe 58.* "Salvia de la Virgen" (Soukup). To Uruguay and Ecuador.

Verbena minima Meyen, Reise um die Erde 1: 451. 1834. *Junellia minima* (Meyen) Mold. Lilloa 5: 398. 1940.

Pulvinate-cespitose, much branched, the rooting branches more or less elongating, the leafy branchlets very short; leaves entire, imbricate, linear-subulate, pungent, spreading-recurved, glabrous except minutely ciliolate toward the shortly connate base, 3–5 mm. long; flowers 2–4 at tip of axillary branchlets, sessile; bracts ovate, acute, ciliolate, equaling the calyx; calyx 4-lobed (5-lobed, Meyen), the equal lobes very obtuse, laciniate-ciliolate, otherwise, as tube, glabrous or puberulent; corolla white or purple-tinted, scarcely as long as calyx tube, the 5 subequal lobes spreading, the throat shortly barbate or hispidulous; stigma lobes minute, obscure, equal (Weddell).—The specific name, sens. lat., may be properly *V. seriphioides* Gill & Hook. in Hook. Bot. Misc. 1: 164. 1830, as apparently the plants are similar, possibly identical.

H. Francia Chisaki, a member of the University of California herbarium staff, kindly noted for me that Meyen in his now rare work gave a quite adequate description as a footnote; the citation, Nov. Act. Acad. Nat. Cur. 19, suppl. 1: 379. 1843, is therefore a repetition of publication.

Forms flat cushions to one-half meter broad (Weberbauer). Illustrated, Weddell, Chlor. And. *pl. 62B.* F.M. Neg. 17431.

Cuzco: Prov. del Cercado, *Gay.*—Arequipa: Chivay, 4,200 meters, *Weberbauer 6895.*—Puno: Grass steppes, Lake Titicaca, *Weberbauer 441;* 85. Mesa alta de Muno, *Raimondi* (det. Werderman, *V. seriphioides*). Near Lake Titicaca, *Meyen,* type; (*Shepard 26*).

Salcedo, *Soukup 43*.—Moquegua: Torata, *Weberbauer 7472* (det. Johnston). Bolivia; Chile. "Koletta."

Verbena occulta Mold. Phytologia 3: 280. 1950.

Erect-ascending obtusely angled branches and branchlets appressed-pilosulous or early spreading pubescent as the short (to 2 cm.) or obsolete terminal peduncles; leaves somewhat amplexicaul, about medially 3-parted, the divisions often few-dentate or if short-lobed the lobes subacute, 1-nerved beneath, dark green and densely subappressed pubescent both sides with different length trichomes; spikes 1.5–4 cm. long; bractlets conspicuous, lanceolate, acuminate, 8–10 mm. long, appressed pubescent as calyx, this 5 mm. long, 5-lobed; corolla purple, the tube 8–10 mm. long, limb 4–5 mm. wide. —A curious species according to the author, who has listed a forma *alba* Mold. from Ancash and Junín.

Cajamarca: (Moldenke).—La Libertad: Near Nevado Cajamarquillo, (*Ferreyra 1298*, type).—Ancash: (Moldenke).—Junín: Cerro de Pasco, 3,800 meters, *Ferreyra 6586* (det. Moldenke).

Verbena officinalis L. Sp. Pl. 20. 1753.

Ascending to erect, the stems glabrous or nearly glabrous, the more or less ovate leaves strigillose both sides, all except the upper petiolar narrowed to base, 1–2-pinnate or 3–5-cleft, the pinnae or lobes incised; spikes ternate or paniculate, slender, elongate; bracts usually about half as long as the glandular calyces, these 2–2.5 mm., subtruncate, minutely dentate; corolla tube slightly exserted, the limb about 4 mm. broad, lobes subrotund; nutlets trigonous, scarcely 2 mm. long, strongly striate, somewhat reticulate above, the faces muricate.

Peru (probably). Widely introduced from Europe.

Verbena parvula Hayek, Bot. Jahrb. 42: 162. 1908.

Perennial from a stout multicipital root, the subsimple arcuate-ascending to erect stem 6–10 cm. tall (type), sulcate-quadrate, appressed setose-scabrous as the leaves both sides; leaves oval or obovate, contracted into petiole, subobtuse, 10–14 mm. long (type), unevenly incised-crenate-serrate or nearly pinnately lobate, lineate-nerved beneath; spikes terminal, simple or few-branched, early narrowly conic, finally elongate; bracts ovate, acute, setose-ciliate, subequaling the calyx, this 1.5 mm. long, minutely setulose; corolla lilac, 3 mm. long, subpuberulent.—A small delicate plant with the habit

of a dwarf *V. officinalis* L. but with completely different leaves (author). Has been found also in Junín and Tacna (Moldenke). Variety *gigas* Mold., Phytologia 7: 85. 1959, has erect stems to 9 cm. tall, elongate internodes, elliptic-oblanceolate leaves to 7.5 cm. long, 2.5 cm. wide; aspect of *V. litoralis*, inflorescence of *V. parvula* (author); Junín, Tarma, *Killip & Smith 21925*, type. F.M. Neg. 17436.

Cuzco: Paucartambo, *Balls B6784*. Bolivia.

Verbena peruviana (L.) Britton, Ann. N. Y. Acad. Sci. 7: 197. 1893; 537. *Erinus peruvianus* L. Sp. Pl. 630. 1753. *V. chamaedryfolia* Juss. Ann. Mus. Paris 7: 73. 1806, fide Moldenke. *V. melindres* Gillies, Bot. Reg. *pl. 1184*. 1828. *Glandularia peruviana* (L.) Small, Man. S. E. Flora 1139. 1933.

Stems filiform, procumbent, pilose-hirsute, furcately branched; leaves oblong-lanceolate or -ovate, broadly cuneate at base, coarsely serrate or crenate, strigose above, hispid especially on nerves beneath; peduncles long, solitary; spikes early congested-capitate, some elongating, becoming lax; bracts lanceolate-subulate, ciliate, much shorter than the canescent hirsute calyces.—Type from Paraguay!; based on a plant of Abbé Feuillée, Per. 3: 36, *pl. 25*. 1725, as noted by Briquet, Ann. Cons. Jard. Bot. Genève 7: 290. 1904; as he pointed out, Britton's transfer (now acceptable) was prompted on the basis of a misdetermination and the plant of Jussieu, as that of Linnaeus, is unknown in Peru unless in cultivation. Flowers brilliant scarlet; there is a forma *rosea* Mold. in Uruguay and probably elsewhere. Illustrated, Bot. Reg. *pl. 1184*.

Peru: In cultivation. To Uruguay. "Melindres colorado," "pampas."

Verbena pogonostoma Klotzch, ex Walp. Repert. 4: 31. 1844–1848; 550.

Diffuse, subcanescent, the branches hirtellous, the leaves above and beneath on the nerves strigose-hispidulous; leaves sessile, cuneate to base, 3-parted, about 4 cm. long, the narrow laciniae pinnatifid-incised and dentate above, lower entire, 2 mm. wide, the ultimate divisions linear-lanceolate, acute, revolute; spikes shortly pedunculate, terminal and lateral, fastigiate, much elongating before anthesis, finally 3 dm. long, dense, strigose-hirtellous and glandular; bracts lanceolate-subulate, as the unequal teeth of the longer calyx, this 6 mm. long, colored; corolla funnelform, the yellowish tube scarcely exserted, gradually ampliated from base to barbate throat, the blue

limb with short rounded lobes; fruit included, the nutlets reticulate dorsally.—Type from garden material of Berlin-Dahlem, origin uncertain; seems, with *V. Matthewsii*, to be a part of *V. laciniata*. F.M. Neg. 17440.

Ancash: Ocros, *Weberbauer 2723* (det. Hayek, *V. trifida*).—Lima: Near Chosica, *Weberbauer 5333* (det. Dahlem). Paraguay?

Verbena tenuisecta Briq. Ann. Cons. Gard. Bot. Genève 7–8: 294. 1904. *Glandularia tenuisecta* (Briq.) Small, Man. S. E. Flora 1139, 1508. 1933.

Decumbent-ascending, 2–3 dm. high, the tetragonal branches early sparsely pilose; leaves triangular, 3-parted-pinnatifid, 2–3.5 cm. long, 2–3 cm. wide, the linear subobtuse or acute (the superior) segments 1–3 mm. wide, lightly substrigose especially on the nerves beneath, glabrescent; spikes terminal, solitary, fastigiate, early ovate-capitate, 1.5 cm. long, finally 3–4 cm. long, relaxing; bracts ovate-lanceolate, 2–3 mm. long, puberulent; calyx tube 7 mm. long, teeth 1–2 mm. long, densely substrigose all over and with a few dark glandular trichomes, the teeth setose at tip; corolla blue, the glabrous tube exserted 3–5 mm., limb about 1 cm. across, the broad emarginate lobes pilose at throat; anther gland scarcely exserted; nutlets about 3 mm. long, strongly reticulate.—Differs from *V. tenera* Spreng. of Brazil in its larger leaves, pubescent calyx and evenly puberulent bracts, from *V. dissecta* Willd. in its merely fastigiate inflorescence as well as by the strigose calyx (author); these differences are the sort, one can imagine, that may exist in varying degrees. Naturalized plants have been referred to *V. tenera* Spreng. and to *V. laciniata* (L.) Briq. (*V. erinoides* Lam.), and Moldenke, Fl. Texas, 3, pt. 1: 41. 1942, has suggested that it may prove referable to one of several older names, as *V. aristigira* S. Moore and *V. mendocina* Phil. Commonly cultivated and, in southeastern United States, naturalized (Moldenke); whether these plants centering around *V. laciniata* are species, genetically, must await results of modern methods of investigation. In any case Briquet's plant as to type is scarcely in Peru. F.M. Neg. 17451.

Cuzco: (Moldenke). Paraguay; Brazil.

Verbena Tessmannii Mold. Phytologia 3: 45. 1948.

Herb, the acutely tetragonal stems, elongate branches, petioles (4–6 mm. long), and peduncles (2–5 cm. long) hirtellous with divaricate trichomes; leaves lanceolate, attenuate at base, acute, 2–4 cm.

long, 7–15 mm. wide, firm-chartaceous, unevenly and coarsely dentate, harshly appressed strigose above with bulbous-based trichomes, shortly pubescent beneath especially on the 4 pairs of slender lateral nerves; spikes elongating to 4.5 cm., dense; bractlets lanceolate, 6 mm. long, subulate, puberulent and long-ciliate; calyx tubular, about 13 mm. long, 5-costate, puberulent and with a few black capitate glands, the 4 subulate tipped teeth 2 mm. long, often recurving; corolla lilac, the slender tube nearly 2 cm. long, unevenly pulverulent, the limb about 8 mm. across.—Type from campos, Paraná, formations of shrubs and tall herbs (Tessmann).

Peru: (Moldenke). Brazil.

Verbena trifida HBK. Nov. Gen. & Sp. 2: 273, *pl. 134*. 1818; 539.

Canescent, the tetragonal branches and subcapitate apical spikes hirsutulous; leaves sessile, crowded, mostly fasciculate in axil of branches, basally cuneate, 12–25 mm. long, generally trifid, the intermediate segment largest, sometimes one or the other part bifid or entire, the lanceolate laciniae revolute, midnerve prominent, lanceolate, acuminate; bracts lanceolate, about equaling the tubular calyx, this 6 mm. long, nervose, the conspicuous subulate teeth subequal; corolla tube little exceeding calyx, the rounded lobes emarginate.—Not seen by Perry, nor placed. *Weberbauer 2723* was referred here by Hayek perhaps correctly, but this, typically at least, has leaves with only three narrow lobes; the type came from Mexico.

Peru (doubtful; cf. note above). Colombia (Moldenke); to Mexico.

Verbena variabilis Mold. Bot. Gaz. 106: 164. 1944.

Perennial herb, to 1 meter tall; stems tough, substrigillose above as the very slender branchlets; leaves sessile, decussate-opposite or approximate, mostly 3-parted with broad segments, each segment entire or with 1–3 large lobes, the leaves on branchlets 3-parted but segments linear and pinnatifid, obtuse, revolute, green but strigillose both sides, 2–3 cm. long, 1–2 cm. wide; peduncles strigillose, to 9.5 cm. long, with 1 or 2 pairs of 3-parted bracts near tip and medial; spikes 2–5 cm. long, dense; bracts long-acuminate, 5 mm. long, glandular with erect spreading trichomes; rachis densely spreading puberulent; calyx about 5 mm. long, glandular; corolla pale purple, the tube somewhat exserted.—Roots "used against fleas," according to the author, who suggested no relationship.

Huancavelica: Córdova, *Metcalf 30255*, type.

Verbena villifolia Hayek, Bot. Jahrb. 42: 164. 1908.

Small shrub, the branches prostrate, the younger densely villous as the opposite shortly petioled cuneate-based trifid leaves, these with cuneate middle lobe 3-lobed, the central lobes bilobed; primary nerves prominent beneath; spikes terminal, subsessile, early fastigiate, finally short-cylindric, the rachis villous; bracts ovate-lanceolate, acute, longer than the calyx, this appressed pilose, 4 mm. long, accrescent in fruit, the roseate corolla scarcely longer; upper anthers unappendaged; fruits 3 mm. long, scrobiculate-rugose.—My collection (det. Johnston) was prostrate in stones along trail, the flowers pink, the villosity yellowish. F.M. Neg. 17458.

Junín: La Oroya, *942; Weberbauer 2582*, type; 180.

Verbena Weberbaueri Hayek, Bot. Jahrb. 42: 163. 1908.

A little depressed shrub, the simple (or nearly) branches only 5–10 cm. long; leaves ovate, 1–1.5 cm. long, obtusely incised-crenate-serrate, densely appressed setose both sides; spikes densely cylindric, setose-hispid, 2–3 cm. long, the ovate-lanceolate acute bracts shorter than the shortly 5-dentate calyx, this 2–3 mm. long; corolla lilac, 3–4 mm. long, setose-puberulent without.—With *V. Hayekii* belongs to section *Verbenaca*, subsection *Pachystachyae* Schauer, DC. Prodr. 11: 539 (Hayek). F.M. Neg. 17459.

Cuzco: (Moldenke).—Puno: Lake Titicaca, 3,700 meters, *Weberbauer 440*, type; 185. Bolivia.

2. HIEROBOTANA Briquet

Like *Verbena* but with only 2 fertile stamens and the calyx slightly accrescent in fruit. The genus is therefore academic, as the occurrence of 2 or 4 stamens, or 4 and only 2 fertile, is traditionally accepted as a generic character within the family. The character, however, as the number of nutlets, probably results in an arbitrary delimitation of groups that naturally are interrelated and should be merged, with sectional names indicating probable origins. Parallel situations occur in the Solanaceae.

Hierobotana inflata (HBK.) Briq. Pflanzenfam. 4, Abt. 3a: 148. 1897. *V. inflata* HBK. Nov. Gen. & Sp. 2: 273, *pl. 135*. 1818; 550.

A canescent strigose-hispidulous procumbent shrub with sessile leaves, 3-parted nearly to base and terminal early sessile and oblong spikes, slightly peduncled and lax in fruit; leaves about 2.5 cm. long,

the lateral segments 2–3-parted, the intermediate 3- or 5-parted, the laciniae linear, subobtuse, revolute; bracts lanceolate-subulate, shorter than the calyx, this 4 mm. long, herbaceous, the nerves ending in 5 subequal subulate mucronate teeth; corolla tube not exserted, the small limb with rounded emarginate lobes, the throat obscurely or scarcely villous; fruit obovoid, the calyx enlarged but only slightly inflated; nutlets 4, reticulate-areolate dorsally.—Strongly apart by the fruiting calyx widened at base, the stamens only 2 (Briquet); expediently, however, it could be retained among the species it resembles otherwise, but it is more clearly defined and probably more remotely derived than the traditionally separated *Lippia;* however, the only basic difference is the stamen reduction, the calyx character appearing in other species, as in *V. juniperina* Lag.

Ayacucho: Río de Lomas, 2,500 meters, *Weberbauer 5749.* To Colombia.

3. LANTANA L.

Shrubs, rarely tall herbs, often sprawling or subscandent and sometimes forming thickets alone or with other plants, usually harshly pubescent with simple trichomes. Flowers often brightly colored orange or red tints and not infrequently changing the tone in age, ordinarily in capitate, less usually cylindric axillary peduncled spikes. Corollas solitary, bracted, sessile, the spreading limb obscurely if at all oblique, the 4 or 5 broad lobes obtuse or retuse. Stamens 4, didynamous, medially affixed, included; anther cells parallel. Ovary 2-celled, the solitary ovules basal and erect or subbasal and lateral. Style often short, the stigma oblique or sublateral. Drupes more or less fleshy with 2-celled nutlet or finally two 1-celled nutlets, smooth or rugulose dorsally.—Species apparently not stable and may be fewer than described; the key here as elsewhere is thus devised expediently, and is scarcely usable without much material; there are probably about half as many genetic species (or even fewer) than names.

Leaves ovate or ovate-lanceolate, rarely somewhat oblong-elliptic, ordinarily acuminate, usually acutely, cordate to somewhat decurrent at base, mostly several to many cm. long and drying dark (unless *L. Sprucei, L. Svensonii*); branches often angled, erect or clambering.

Flower heads soon spiciform; corolla lilac-rose or throat yellowish.

Leaves hirtellous to glabrate beneath.....*L. trifolia.*

Leaves pilose-tomentose beneath.....*L. Fiebrigii, L. fucata.*

Flower heads little if at all longer in fruit; corolla orange-red except as noted.

Peduncles shorter or little longer than leaves.

Branchlets partly white hispidulous, not aculeate.
L. Weberbaueri.

Branchlets glandular or aculeate or both.

Glandulosity, aculei often obvious.
L. foetida, L. armata, L. Moritziana, L. Camara.

Glandulosity, aculei lacking or at least one obscure; corolla not orange-red (ex char.).

Corolla red, well-exserted; leaves early plane.
L. cujabensis.

Corolla whitish; leaves rugose, cordate (type).
L. Chamissonis.

Corolla white; leaves plane, long-decurrent..*L. canescens.*

Corolla (known) rose-lilac or yellow; leaves rugose.
L. rugulosa.

Peduncles even in flower mostly longer than leaf (types, expedient).

Flowers yellow, turning red; indument partly viscid.
L. tiliaefolia.

Flowers white or tinted; indument eglandular.

Branchlets and peduncles glabrescent.....*L. Sprucei.*

Branchlets and peduncles early long-hirsute...*L. Svensonii.*

Leaves (unless last two species above) mostly or all at most about 4 cm. long, shortly or not acuminate, often subobtuse, often drying gray-green; branches subterete, prostrate-ascending or low.

Leaf indument various but not velvety beneath (all may be phases of one).

Corolla yellow to orange, rarely whitish; peduncles mostly to 3 times longer than leaf.

Leaves firm, soon strongly rugose.*L. reptans, L. scabiosaeflora.*

Leaves chartaceous, rather faintly rugulose.....*L. limensis.*

Corolla lilac, purple or white (unknown, *L. Pavonii*); peduncles mostly 2 times longer than leaf.

Corolla purplish.

Leaves acute at base, about ovate.
L. Ferreyrae, L. angustibracteata.
Leaves attenuate (decurrent?) to base.....*L. Pavonii.*
Corolla white.....*L. Haughtii.*
Leaf indument compactly tomentose beneath; bracts all broad; corolla lilac or white.....*L. Haughtii, L. Zahlbruckneri.*

Lantana angustibracteata Hayek, Bot. Jahrb. 42: 168. 1908.

Branches and leaves beneath appressed setose-villous; leaves ovate-oblong or ovate, subobtuse, the upper in type to about 3 cm. long, half as wide, crenate-serrate, deeply nervose-rugose, appressed setose above, as the erect peduncles (these longer) and the lanceolate acute bracts that are shorter than the flowers, the outer slightly recurved; heads ovoid-globose; corolla nearly 1 cm. long, puberulent, lilac.—Similar to *L. velutina* Mart. & Gal. but eglandular and bracts small as in *L. canescens* HBK. and *L. trifolia* with entirely different leaves (author). F.M. Neg. 17461.

San Martín: Pacasmayo to Moyobamba, (*Stuebel 35*, type).—Ancash: (Moldenke).

Lantana armata Schauer in DC. Prodr. 11: 597. 1847.

Tetragonal branches and peduncles densely hirsute-aculeate; leaves broadly ovate, the rounded base abruptly decurrent into petiole 12–18 mm. long, attenuate acuminate to apex, 5–10 cm. long, nearly 4–6.5 cm. wide, coarsely crenate, lineately rugose, asperous above, subcanescently hirtellous beneath; heads hemispheric, the involucral strigose hirsute, outer bracts linear-lanceolate, as long as lower flowers, the inner half as long, subulate-lanceolate; corolla tube 8 mm. long.

Lima: (Moldenke). Colombia.

Lantana Camara L. Sp. Pl. 627. 1753; 598. *L. aculeata* L. l.c. 974, fide Schauer.

Branches often spreading, tetragonal, glabrate or sens. lat. pubescent or hirsute-pilose, more or less aculeate or merely scabrous, the younger usually puberulent as the rigid peduncles, these about as long as or longer than the leaves, and the capitate inflorescences; petioles short, somewhat or scarcely merging into the cuneate or rounded base of the ovate-oblong shortly acuminate leaves, these serrate-crenate, reticulate rugose, very scabrous above, often canes-

cently short-villous beneath; heads subumbellate, the oblong-lanceolate acute to subulate bracts 4–7 mm. long, appressed strigose; tube of the (usually) early yellow, or orange, or changing orange to red corolla puberulent, about 1 cm. long, limb 6–8 mm. wide; calyx membranous, 3 mm. long; drupes black, 3 mm. thick.—Highly variable vegetatively, including the flowers that may be white or yellow or more often change, besides reds, to blues or purples; many given varietal names (!); most worthy of this taxonomic attention is var. *aculeata* (L.) Mold. Torreya 34: 9. 1934, prickles or spines conspicuous, often recurved, the yellow-orange flowers finally pink or roseate and the var. *mista* (L.) L. H. Bailey, Cycl. Am. Hort. 884. 1900, young branchlets spreading hirsute, outer flowers soon saffron or brick red, inner orange; it has been collected in Piura, Lima and Tacna (Moldenke).

An infusion of the leaves is used medicinally (Herrera). Only a few of the many collections referred here are cited; probably variable and should include several named sorts.

San Martín: Tarapoto, *Goodspeed Exped. 35021; 35041; Williams 5763.* Zepelacio, *Klug 3385.*—Lima: Hacienda Tarate, *Soukup 2894.*—Huánuco: Near Huánuco, *2038.* Pozuzo, *4719; 4567; 4762.* Río Chinchao, *5052.*—Junín: La Merced, *5320.* Chanchamayo Valley, *Schunke 1577.* Huancayo, Oxapampa, *Soukup 2315.*—Apurímac: Pincos, *Stork & Horton 10665.*—Loreto: Yurimaguas, *Williams 3804; 3940; 4941.* Iquitos, *Williams 3530; 1426; 7911.*—Cuzco: Prov. de Paruro, (*Raimondi*). Valle de Santa Ana, *Herrera 964.* Valle del Marcapata, *Herrera 1150.* Valle del Urubamba, *Herrera 3183; 3218.* South and Central America; widely naturalized. "Aya-manchana," "lauraimana" (Herrera).

Lantana canescens HBK. Nov. Gen. & Sp. 2: 259. 1818; 607.

Canescently serrico-strigose and glandular-punctate, sometimes more strigose-hirtellous and scabrous; branches strict, tetragonal, sulcate; leaves opposite, ovate-oblong or oblong-lanceolate, attenuate and entire to petioles, crenate-serrate toward acuminate apex, lineate-rugose; peduncles subequaling or shorter than leaves; heads more ovoid, finally ovoid-oblong, the laxly imbricate spreading bracts ovate-oblong or lanceolate, acuminate, the larger outer involucral, the inner half as long as the white corolla; fruit nearly dry, the nutlets costate-rugose.—May not be in Peru, but following, at least sens. lat., apparently belong to it; but compare *L. Svensonii.* F.M. Neg. 39489.

Apurímac: Pincos, *Stork & Horton 10666* (det. Standley, *L. rugulosa*). Prov. Abancay, *Goodspeed Exped. 10585; Vargas 9804.*—Cuzco: Valle de Lares, *Herrera 787.* Valle del Urubamba, *Herrera 1549.* To Mexico; Venezuela and Brazil. "Canirca" (Herrera).

Lantana Chamissonis (D. Dietr.) Benth. & Hook. ex Jackson in Ind. Kew. 2: 28. 1895, or Briq. Nat. Pflanzenfam. 4, Abt. 3a: 151. 1895. *Lippia Chamissonis* D. Dietr. Syn. Pl. 3: 598. 1843; 580.

Stems herbaceous, erect, divaricately branched, the branches quadrate, hirsute; petioles about 1.5 cm. long; leaves cordate-ovate, acuminate, to about 7 cm. long, serrate, venose-rugose, early strigose, then scabrous above, canescent-tomentose beneath; peduncles simple or geminate, shorter than the leaf; heads subglobose; bracts herbaceous, ovate, shortly acuminate, squarrose, or in fruit reflexed, strigose-hirsute as membranous calyx, exceeded by corolla tube; corolla white, throat flavescent; capsule exposed, lustrous.—Some specimens resemble *L. fucata* Lindl. and some herbarium material (det. Moldenke) has leaves cuneately narrowed at base!

Junín: (Moldenke). Paraguay; Brazil.

Lantana cujabensis Schauer, in DC. Prodr. 11: 599. 1847.

Branches spreading, elongate, subherbaceous, obtusely 4-angled, unarmed or muricate as the finely strigillose peduncles; leaves glandular punctate beneath, glabrate or subtomentose; heads hemispheric, bracts scabrous hirtellous, the outer broadly ovate, acuminate, early involucral, the inner oblong-lanceolate, acute, to about a third shorter than corolla.—Otherwise very much like *L. Camara* L. (author); may, at least in Peru, largely supplant *L. Camara* but doubtfully distinct. Collected, according to Moldenke, also in Tumbez, Junín and Loreto.

Peru: Without locality, *Poeppig 1405.*—Loreto: Boqueron Padre Abad, *Woytkowski 34400.* Brazil; Bolivia.

Lantana Ferreyrae Mold. Amer. Journ. Bot. 38: 326. 1951.

Prostrate leafy closely branched shrub, canescent-strigose including the ovate acute bracts without, the antrorse pubescence especially dense on the leaf-venation, petioles (3–5 mm. long), and peduncles, these 3.5–5.5 cm. long; leaves ovate or ovate-elliptic, acute at base, rounded to subacute at apex, 1.5–3 cm. long, 7–18 mm. wide, scabrous and bullate above by the 4–5 slender impressed lateral nerves and veins; heads hemispheric, a cm. or two wide; bracts 6 mm. long,

2–4 mm. wide, often slightly resinous glandular, as the tube (8 mm. long) of the white corolla, the limb 4–5 mm. across.—The author records the collector as his good friend and colleague but curiously does not compliment him by justifying the proposal of this as a new species.

Amazonas: Road to Leimebamba, near Chachapoyas, 1,800 meters, (*Ferreyra 7130*, type).

Lantana Fiebrigii Hayek, Bot. Jahrb. 42: 169. 1908.

Small shrub with virgate 6-angled strigose branches and opposite or ternate ovate or elliptic leaves contracted into the short petioles; leaves appressed crenate-serrate, rugulose, scabrous above with bulbous-based setae, canescent-tomentose and finely glandular-punctate beneath, 5–8 cm. long, 4–5 cm. wide, the longer strigillose peduncles erect; heads soon elongating, finally cylindric, the ovate long-acuminate densely pubescent bracts shorter than corolla tube, the little larger outer ones involucrate; corolla lilac-rose with yellowish throat, the densely puberulent tube 1 cm. long, limb 6–7 mm. broad.—Very near *L. trifolia* L. but leaves tomentose beneath, flowers nearly twice as large (author); however, Standley referred the following to the Linnaean species, perhaps correctly, as a variant. Much other material, if this is distinct, belongs here rather than to *L. trifolia*. Also in Ancash and Junín (Moldenke).

Cajamarca: Prov. Cutervo, *Stork & Horton 10156*.—Huánuco: Chinchao, *Stork & Horton 9579*.—Cuzco: Marcapata, *Vargas 9686*. Prov. Convención, *Vargas 817*. To Argentina.

Lantana foetida Rusby, Bull. N. Y. Bot. Gard. 4: 431. 1907.

Glandular with spreading trichomes; branches divaricate, acutely quadrate; petioles stout, to 1.5 cm. long; leaves ovate, abruptly acute or truncate or subcordate at base, acute or subobtuse at apex, the many teeth mostly obtuse, about 5–10 cm. long, 3–7 cm. wide, rugose, paler with yellowish veins beneath; peduncles to 1 dm. long; heads 1.5 cm. thick or in fruit 2–2.5 cm.; bracts ovate, acute, 2–4 mm. long; calyx 2 mm. long, truncate, corolla pubescent, 1 cm. long, curved, 2 mm. thick at ventricose middle, lobes to 3 mm. wide, spreading; longest stamens reaching to middle of tube; fruit 7 mm. long, 5 mm. thick, rounded, black, lustrous.—Key character after a hort. spec. Dudley Herb., det. Moldenke; *Bang 2034* pt., Bolivia, type.

Huánuco: Acomayo, *Woytkowski 34250*.—Junín: San Ramón, *Constance & Tovar 2223*.—Apurímac: Pincos, *Stork & Horton 10665*.

—Cuzco: Machu-Picchu, *Herrera 3193* (distr. as *L. Camara* and *L. trifolia*). To Patagonia.

Lantana fucata Lindl. Bot. Reg. 10: *pl. 798*. 1824. *L. lilacina* Desf. Cat. Hort. Paris ed. 3. 392. 1829; Schauer in DC. Prodr. 11: 604. 1847.

Erect glandular punctate shrub, the tetragonal divaricate branches as the peduncles and bracts strigose-hirtellous; leaves crenate, ovate, oblong or lanceolate-triangular, acute or obtuse, subcuneately produced into petiole at the rounded or slightly cordate base, impressed lineate and reticulate-rugose, above green but hirtellous-scabrous, beneath pubescent or canescently tomentose; heads hemispheric, soon spiciform, the membranous, pale, ovate or oblong acuminate bracts squarrose, the inner half as long as the corolla, the smaller outer subcordate-ovate; calyx minute; corolla rose-lilac, the tube 6–8 mm. long.—The leaf shape at base appears to be distinctive.

Peru: (Moldenke). To Brazil; Venezuela.

Lantana Haughtii Mold. Phytologia 1: 463. 1940.

Branches slender, 4-angled, early densely appressed-puberulent; leaf scars large, corky, divergent; petioles very slender, 4–8 mm. long, short whitish pubescent; leaves lanceolate or elliptic-ovate, acute or acuminate at base, obtuse, 1–3.5 cm. long, 0.7–2 cm. wide, firm-chartaceous, dark green but bullate and closely appressed-strigose above, gray-green tomentulose beneath, the 4–6 secondary nerves deeply impressed above; inflorescences axillary, capitate, 2 peduncles per node, 3–6 cm. long; heads canescent pubescent, 1–1.5 cm. in diameter; bractlets broadly elliptic or ovate, acute, 9 mm. long, 4 mm. wide, canescent-pubescent or substrigose; corolla white, the tube 7 mm. long, the limb about 3 mm. wide.

Piura: Amotape Hills, *Haught 139*, type; *42*.—Cajamarca: (Moldenke).—Amazonas: (Moldenke).—Junín: La Oroya, *Kalenborn 73* (det. Moldenke).

Lantana limensis Hayek, Bot. Jahrb. 42: 166. 1908.

Procumbent, suffruticose, the subterete branches minutely appressed scabrous as the slender peduncles that twice exceed the ovate leaves; leaves shortly acuminate, somewhat produced into petiole, 4–6 cm. long, 2–4 cm. wide, serrate, rugose, early appressed setulose, densely soft-pubescent beneath; heads umbellate-fastigiate, not elongating, 2.5–3 cm. broad, the inner linear obtuse little ciliate bracts

half as long as corolla tube, the outer subspathulate, about equaling the corolla, this puberulent, about 1 cm. long, orange.—Resembles in habit *L. scabiosaeflora* but fruit unknown (author); perhaps a coastal race. F.M. Negs. 7870 (as *L. scabiosaeflora*); 17473.

Piura: Serrán, *Stork 11367*.—Lima: Canta, *Pennell 14615* (det. Johnston). Barranco, limestone area, (*Weberbauer 1654*, type). San Bartolomé, *Weberbauer 5264*. Trailing in lomas along the sea, *5959*. Chosica to Matucana, *Goodspeed 11319*.—Junín: (Moldenke).

Lantana Moritziana Otto & Dietr. Allg. Gartenzeit. 9: 369. 1841, and ex Schauer in DC. Prodr. 11: 599. 1847.

Ex char. resembles greatly *L. Camara* and *L. cujabensis;* prickles lacking or scattered and minute, the branches and peduncles hirtellous, these shorter than leaves; leaves scabrous also beneath; bracts strigose, subulate, much shorter than corolla, the outer lanceolate, early involucral, the lower subequaling the flowers; calyx 2 mm. long, scabrous; corolla tube 8 mm. long, limb 4 mm. broad, the smaller lateral lobes truncate, others subquadrate, entire.—Like the variable *L. Camara* L. unless for the narrow foliaceous outer bracts (Schauer). Has been collected in Junín, Huánuco, Loreto, Apurímac, Madre De Dios (Moldenke).

San Martín: Tarapoto, *Woytkowski 35021* (det. Cuatrecasas, *L. Camara*); *35182* (det. Standley, *L. tiliaefolia*). Chazuta, *Klug 4074* (det. Standley, *L. tiliaefolia*). Venezuela.

Lantana Pavonii Mold. Phytologia 1: 464. 1940.

Slender margined branchlets, petioles—these 2–5 mm. long—leaves above and peduncles (2–3 cm. long) more or less sparsely hirsute or hirsutulous; leaves elliptic or subrotund, acuminate at base, acute or obtuse, 1–3 cm. long, 3–15 mm. wide, crenate-serrulate, chartaceous, in age scabrous and bullate above, rather densely hirsute beneath; inflorescences solitary, the heads to 8 mm. long, 19 mm. wide.—A perplexing species (author)! Seemingly referable here is a Madrid specimen with an herbarium name suggesting a decumbent habit, from the Ruiz and Pavón expedition. F.M. Neg. 29684.

Peru(?): Without data, *Ruiz & Pavón*, type (Delessert Herb., Geneva).

Lantana reptans Hayek, Bot. Jahrb. 42: 167. 1908.

A shrub with long procumbent-ascending appressed strigose branches; leaves broadly cuneate-ovate, subentire below, serrate

above, 1.5–2 cm. long, 1–1.5 cm. wide, reticulate-rugose, the nerves impressed above where sericeous-scabrous, prominent beneath where strigose-tomentose; peduncles several times longer than leaves, appressed setose; heads hemispheric, 1.5–2 cm. broad, the ovate-lanceolate acute bracts nervose, appressed sericeous-strigose, the outer little shorter than the corolla-tube, the involucrate outer equaling it; corolla subpuberulent, 6–7 mm. long, lemon-colored.—By habit and indument easily distinguished from *L. scabiosaeflora* (author). F.M. Neg. 17484.

Cajamarca: Below Santa Cruz, 1,300–2,000 meters, (*Weberbauer 4143*, type).—La Libertad: (Moldenke).—Ancash: (Moldenke).—Huancavelica: (Moldenke).—Ayacucho: (Moldenke).

Lantana rugulosa HBK. Nov. Gen. & Sp. 2: 261. 1818; 602.

Branchlets quadrate, pilose hirsute, or the petioles (8–12 mm.) and peduncles, these solitary, equaling or exceeding the leaf; leaves ovate, acute at base, acuminate, 7–10 cm. long, 3.5–5 cm. wide, coarsely mucronate-crenate, strongly reticulate-rugose, hirtellous above, canescently lanate tomentose; heads hemispheric, scarcely longer after anthesis, involucrate, the lanceolate acuminate bracts strigose as the very short calyx, the inner half as long as the flowers, the outer foliaceous, 3–5-nerved, equaling the head; corolla villosulous without, tube 8 mm. long, curved and dilated medially; drupe dark violet.—May be a part of *L. Camara*.—The Cajamarca plant is var. *parvipedunculata* Mold. Said to be a robust shrub a meter tall or taller.

Cajamarca: Chota, *Stork & Horton 10037; 10074; Raimondi 309*.—Huánuco: Pillao, *Woytkowski 34045*. Pozuzo, *4769*. Muña, *4022; 4062; 4268*. Mito, *1523*.—Junín: Agua Dulce, *Woytkowski 35443*.—Ayacucho: Yanamonte, *Weberbauer 5615*. Pampalca, *Killip & Smith 22244*.—Apurímac: Huancarana, *West 3763*. To Colombia. "Aia" or "aya-rosa."

Lantana scabiosaeflora HBK. Nov. Gen. & Sp. 2: 261. 1818; 602.

Branches procumbent, slender, subangulate, pilose as the short petioles and filiform peduncles, these 3.5–10 cm. long; leaves subrhombic-ovate, cuneate to entire base, less than 2.5 cm. long, coarsely crenate-serrate toward acute tip, strigose scabrous above, softly pilose beneath; heads small, hemispheric; bracts herbaceous, all lanceolate, acute, hirtellous strigose and ciliate both sides, lineate-nerved, the

inner about as long as corolla tube, the longer outer involucral; calyx about 1 mm. long, bifid, pilose, ciliate; corolla yellow or white with yellow center, finely sericeous, the slightly curved tube oblong-ventricose medially.—There is a f. *albida* Mold. in Ecuador and probably in Peru. F.M. Neg. 39488.

Piura: Huancabamba, (*Bonpland*, type).—Cajamarca: Socota, *Stork & Horton 10106*.—Ancash: Casma, *Goodspeed Exped. 9180*. Chacchan, *2535*. Baños de Chancos, *Sandeman 4607* (det. Standley, *L. limensis*).—Lima: East of Sayán, Prov. Chancay, *Goodspeed (33040)*. Matucana, *80; Goodspeed Exped. 11333*.—Junín: Huariaca, *3103*.—Huancavelica: Mantaro, *Stork & Horton 10400*.—Huánuco: Near Huánuco, *2086; 3220*.—Apurímac: Curahuasi, *Vargas 9609*. Pincos, *Stork & Horton 10659; 10666*. Abancay, *Vargas 741*. —Arequipa: Chala, *Worth & Morrison 15606*.—Moquegua: Torata, *Weberbauer 7404; 7406*. Ecuador.

Lantana Sprucei Hayek, Repert. Sp. Nov. 2: 162. 1906.

Branchlets subtetragonal, sparsely appressed pilose; leaves oval and obtuse or the upper rhomboid-lanceolate and acute, long-decurrent, coarsely crenate-serrate, plane, minutely setulose scabrous both sides and also shortly hirtellous beneath; peduncles glabrescent, to three times larger than the subtending leaf; heads fastigiately umbellate, not elongating, the larger outer bracts involucral, the inner ovate, subacute, slightly puberulent, about as long as the subglabrous corolla, this 11–15 mm. long; style 2 mm. long.—Affine *L. hispida* HBK. of Mexico but glabrescent, leaves plane, peduncles longer, flowers larger, bracts less pilose (author); suberect, prostrate or rarely erect shrub common on rocky slopes, dunes and sea cliffs, the flowers white to pale purplish with yellow center, leaves acute to obtuse with appressed to spreading pubescence (Svenson). Type from Chanduy, near Peru. F.M. Neg. 34336.

Piura: Cerro Prieto, (*Haught & Svenson 11619; 11575*). Amotape Hills, (*Haught & Svenson 11536*). Ecuador.

Lantana Svensonii Mold. Geogr. Distrib. Verb. 78. 1942.

Low shrub, the subquadrate branchlets, often subulate petioles (5–10 mm. long) and solitary peduncles—these to 1.5 dm. long—early spreading hirsute, more or less subappressed pubescent to glabrate in age; leaves ovate or ovate-elliptic, crenate-serrate almost to the narrowly long-attenuate petioles, acute, 2.5–7.5 cm. long, 1–3.5 cm. wide, chartaceous or membranous, densely substrigose or

subvelutinous above, shortly pubescent or tomentulose beneath; heads ovate-cylindric, to 2.3 cm. long, 2 cm. wide, at base with foliaceous ovate acute strigose-puberulent bracts (often ciliate) to 13 mm. long, 9 mm. wide; corolla hypocrateriform, white or pale lilac, yellow at throat, the slender puberulent tube about 5 mm. long, limb 3 mm. wide.—Compare *L. Chamissonis* in herb. not as to type, ex char. *Soukup 4199* was a bush 6–7 dm. tall, forma *albiflora* Mold. Phytologia 5: 12. 1954.

Tumbez: Hacienda Chicama, *Weberbauer 7676; 7660; 7686.*—Piura: Parinas Valley, *Haught 127.* Negritos, *Haught 12.* La Brea, *Horton 11579.*—Cajamarca: (Moldenke).—Lambayeque: Olmos, *Soukup 4199.*—Arequipa: (Moldenke). Ecuador.

Lantana tiliaefolia Cham. Linnaea 7: 122. 1832; 600.

Branches spreading, tetragonal, unarmed or finely aculeate, villous-pubescent or villous as peduncles (these at least as long as leaves), the indument now entirely viscid, now partly glandular; leaves subrotund or ovate, cordate, truncate or cuneate into short petioles, acuminate, serrate-crenate, reticulate-rugose, villous both sides or strigose scabrous above, shortly villous or tomentose beneath; heads hemispheric, bracts strigose-hirtellous, the oblong inner 2–3 times shorter than corolla tube, the outer lanceolate or subspathulate, two times longer, flowers orange or red.—None of the following is probably distinct from *L. rugulosa.* F.M. Neg. 34340.

San Martín: Tarapoto, *Woytkowski 35182* (det. Cuatrecasas); *Williams 5387* (det. Standley). Chazuta, *Klug 4074.*—Loreto: Iquitos, *Williams 1365.*—Cuzco: Valle de Lares, *Diehl.* Quillabamba, *Soukup 153.* Valle del Apurímac, *Herrera.* Brazil. "Aye manchana."

Lantana trifolia L. Sp. Pl. 626. 1753; 606.

Suffruticose, the stems strict, hexagonal, the peduncles quadrangular, both strigillose, hirtellous or hirsute; leaves 3–4-verticillate, or opposite, ovate or oblong, attenuate at base, acute or acuminate, several cm. to a dm. long, crenate-serrulate, often reticulate-rugose, above scabrous or strigose, beneath resinous, punctate and hirtellous-tomentose; peduncles solitary in the axils, finally subequaling the leaves; spikes soon oblong, much elongating, 1–1.5 cm. thick; bracts herbaceous, ovate, cuspidate-acuminate, 5-nerved, strigose, laxly imbricate, the lower to 1 cm. long, 3 mm. wide, the upper about as long

as corolla tube or 5–6 mm. long; lower lip of corolla short, middle lobe sessile at throat.—Variable in indument; corolla small, lilac, the throat yellow (Schauer); drupes purple or paler, 2–3 mm. thick. There is forma *hirsuta* Mold. in Colombia and of course elsewhere and a forma *oppositifolia* Mold. in San Martín. *L. Fiebrigii* Hayek, Bot. Jahrb. 42: 169. 1908, of Bolivia, is very near but has leaves tomentose beneath, flowers 1 cm. long, 6–7 mm. wide (author).

San Martín: Tarapoto, *Goodspeed Exped. 35014; 35020; 35184; Williams 5400; 7053.* Zepelacio, *Klug 3310.*—Lima: Hacienda Villa, *Soukup 2915.*—Huánuco: Piedras Grandes, *3675.* Río Chinchao, *4975.*—Junín: *Raimondi 7564; 12864.* La Merced, *5323.* Huacapistana, *Killip & Smith 24112.*—Loreto: Puerto Arturo, *Killip & Smith 27715.* Yurimaguas, *Williams 4224; 4982.*—Cuzco: Valle del Urubamba, *Herrera 1748* (det. Werdermann); *8523.* Convençión, *Herrera 169.* Machu-Picchu, *Herrera 3193.* Warmer America.

Lantana Weberbaueri Hayek, Bot. Jahrb. 42: 166. 1908.

Low procumbent shrub with unarmed branches densely stipitate-glandular, spreading, setulose and hispid-setose; leaves opposite, regularly serrate, ovate, cuspidate-acuminate, rounded basally and minutely produced into petiole, 6–8 cm. long, 3.5–4.5 cm. wide, lineate-rugose, densely appressed setose above, setose-villous on nerves beneath; peduncles pubescent as the branches, erect-spreading, little enlarged toward apex, slightly exceeding the leaves, the hemispheric heads 2.5–3 cm. broad, the much larger outer bracts (subequaling the flowers) involucrate, the inner (much shorter) ovate-lanceolate, cuspidate, densely setose-villous; corolla 12–15 mm. long, shortly pubescent, orange with red edges; heads globose in fruit, the pyrenes 2–3 mm. long.—Equally resembles *L. robusta* Schauer and *L. viscosa* Schauer; from the first differs in long-setose stem and peduncles; from the second in the shorter fewer glandular trichomes and the not elongating heads (author). F.M. Neg. 17493.

Huánuco: (Moldenke).—Junín: Toward Palca above Huacapistana, 1,900 meters, (*Weberbauer 2017*, type).

Lantana Zahlbruckneri Hayek, Bot. Jahrb. 42: 167. 1908.

Shrubby, the terete branches finely puberulent as the slender peduncles, these about as long as the leaves; leaves crenate, ovate-oblong, rounded or broadly cuneate at base, obtuse, moderately reticulate-rugose, minutely but velvety puberulent above, canescently appressed tomentose beneath; heads hemispheric, little elongating,

about 2 cm. broad; bracts ovate, acute, entire, tomentulose, subequaling corolla-tube, the involucrate outer little larger; calyx tomentose, scarcely 1 mm. long; corolla lightly puberulent, the narrow tube 6 mm. long, pale lilac with yellowish throat; drupes 3 mm. long. —Habit of *L. odorata* L. but appressed tomentulose, corolla tube narrow, heads not greatly elongating; from *L. lilacina* Desf. (i.e. *L. fucata* Lindl.) and *L. velutina* Mart. & Gal. differs in the small crenate leaves and soft indument (author); and in reference to the last character Zahlbruckner had given it an herbarium name. Occurs also in Lima according to Moldenke. Could be an extreme state of *L. canescens* HBK. and the latter could include *H. Haughtii* Mold. F.M. Neg. 17494.

Piura: Huancabamba, *Weberbauer 6068*.—Cajamarca: Shumba to Jaën, *Weberbauer 6181*.—Amazonas: Tupen, 800–1,000 meters, (*Weberbauer 4778*, type).—Loreto: Salinas de Pilluana on the Río Huallaga, (*Ule 6822*).—Arequipa: Atiquipa, *Worth & Morrison 15643*.

4. LIPPIA L.

Phyla Lour. Fl. Cochinch. 66. 1790. *Aloysia* Ortega ex Pers. Syn. Pl. 2: 139. 1807.

Much like *Lantana* but often less harshly pubescent if at all, the trichomes in some herbs malpighiaceous, the spikes often elongate (*Aloysia*) or subcapitate and rather few-flowered, less frequently subcapitate, compact. Bracts not or more or less 4-ranked, persisting to deciduous, the calyx either compressed, bicarinate or bialate (bracts persisting) or 2–4-angled or cleft or 4 dentate (former, *Phyla;* latter, *Aloysia*). Corolla limb oblique, often sub-bilabiate. Fruit at least typically included, dry, the nutlets rarely free.—Has been united with *Lantana* but the mature fruit and often the calyx provide identification. In Peru the inflorescence is solid (*Phyla*) or if capitate more or less open, otherwise spicate. *L. aprica* Phil., once accredited to Peru, is Chilean. *L. valerianoides* Walp., Nov. Act. Acad. Leopold Carol. Nat. Cur. 19. suppl. 1: 377. 1843, listed by Moldenke as a Peruvian species, was referred in Herb. Dahlem (Berlin) to *Valeriana;* curiously, however, it was not mentioned in that genus by Killip. Named for A. Lippi, an Italian botanist.

Svenson, Amer. Journ. Bot. 33: 480. 1946, noted that 2-armed trichomes in themselves do not indicate generic character (for example, *Phyla*) since they are present in many families. DeCandolle, Prodr. 17: 296. 1873, referred *Phyla* Lour. to *L. nodiflora* L. How-

ever, Moldenke (Fl. Suriname) retains *Phyla* (at least for one species) on herbaceous or subherbaceous state and habit, cuneate-obovate bracts not 4-ranked; Abrams recognizes *Phyla* Lour. and *Aloysia* Ortega without reference, however, to *Lippia*, from which *Aloysia* is the weaker segregate. *A. ayacuchensis* Mold. is omitted from key.

The Lemon Scented, Sweet Verbena or Yerba Luisa of gardens is *L. triphylla* (L'Hér.) Ktze. of Chile with verticillate linear-lanceolate fragrant (gland-dotted) leaves and small bluish flowers in slender spikes; also known as *Aloysia triphylla* (L. Hér.) Britton, the latter group name as the Spanish, in remembrance of Maria Louisa, wife of Charles IV of Spain.

Peduncles except *L. alba* ordinarily as long as or longer than the solitary or geminate compact globose-ellipsoid or oblong-cylindric inflorescence; plants erect, strict or rooting nodally; corolla often obscure or tube included.

Leaves commonly distinctly or somewhat longer than wide, often obovate or ovate.

Plants trailing.....*L. subterranea, L. nodiflora.*

Plants erect, virgate.

Leaves more or less villosulous beneath.....*L. alba.*

Leaves sparsely strigose.....*L. americana.*

Leaves rhombic-ovate, not much longer than wide.
L. betulaefolia.

Peduncles very short or inflorescence clearly longer than thick or not rigidly compact or corolla tube exserted; shrubs, sometimes virgately branched.

Inflorescence subcapitate but laxly, few-flowered.

Leaves flabellate-subrotund.....*L. antaica.*

Leaves cuneate-obovate to oblong-lanceolate.

Leaves entire or few-dentate, slightly or not obovate, bright green.....*A. Herrerae, L. Fiebrigii.*

Leaves crenate-serrulate at least above base, more or less obovate and canescent or pale.

Indument minute or obsolete on leaves above, granular beneath.....*L. ferruginea.*

Indument asperous-hirsutulous above.

Leaves appressed puberulous beneath.....*L. turbinata.*

Leaves pilosulous beneath.....*L. tayacajana.*

Inflorescence spicate, clearly longer than thick at anthesis, often lax, many-flowered.

Leaves rarely ternate; calyx teeth obvious to conspicuous (species apparently in part weak but key in some cases only from char.).

Leaves subconcolor, granular at least beneath, rugulose if at all only in age.

Indument in part pilosulous; leaves membranous. *L. aloysioides.*

Indument a puberulence; leaves subcoriaceous. *A. minthiosa.*

Leaves more or less canescent beneath, early finely reticulate-rugose unless *L. peruviana, L. virgata.*

Calyx teeth ovate, acute.....*L. peruviana.*

Calyx teeth subulate or ovate-subulate.

Leaves membranous, cordate; indument in part hirsutulous or crisply pilose.....*L. leptophylla.*

Leaves firm, early rugulose, rounded to subobtuse; indument not or obscurely hirsute. *L. spathulata, L. scorodonioides.*

Calyx teeth subulate-filiform; leaves ample, ovate, membranous, subobtusely acuminate.....*L. virgata.*

Leaves 3–4-verticillate; calyx teeth minute.....*L. triphylla.*

Lippia alba (Mill.) N. E. Br. in Brit. & Wils. Sci. Survey Puerto Rico 6: 141. 1925. *Lantana alba* Mill. Gard. Dict. ed. 8, no. 8: 1768. *L. geminata* HBK. Nov. Gen. & Sp. 2: 266. 1818, fide Briquet.

Strict, the virgate tetragonal branches as the peduncles and leaves above densely hirtellous-strigose-puberulent; leaves opposite or ternate, elliptic to roundish-ovate, narrowed to 3–8 mm. long petiole, acute or obtuse, crenate, more or less rugose, canescent tomentose-villous beneath; peduncles short, axillary, enlarged above; heads early subglobose, shortly oblong or oblong in fruit, 8–12 mm. long; bracts often broadly ovate-acuminate, strigose, the inner about as long as corolla tube (4–5 mm.), the outer spreading; calyx about 2 mm. long, bidentate; corolla some purple tone or white; drupes dark violet.—A meter or two tall, aromatic.

Piura: Prov. Ayavaca, *Weberbauer 6346.* Huancabamba, *Weberbauer 6013.*—La Libertad: (Moldenke).—San Martín: Tarapoto,

Williams 5581. San Roque, *Williams 7325; 7359.*—Loreto: Yurimaguas, *Williams 4475; 4997.* Caballo-cocha, *Williams 2212.* Río Itaya, *Williams 183.* Nanay, *Williams 344.* Leticia, San Salvador and La Victoria, *Williams 3055; 2636; 1559.* Warm America; widely introduced or cultivated. "Pampa-oregana," "oregano," "orega," "cidraero," "sideraera," "pan poregano."

Lippia aloysioides Loes. in herb. ex Mold. Phytologia 2: 10. 1941. *Aloysia aloysioidès* Loes. & Mold. ex Mold. Phytologia 2: 9. 1941.

Shrubby, the rather slender glabrous branches with corky leaf-scars 2–3 mm. high, the short branchlets, petioles (1–2 mm. long), peduncles (2–3 cm. long) and rachis of the spikes, these 5–8.5 cm. long, about 1 cm. thick in flower, sparsely (the rachis densely) spreading pilose; leaves ovate, truncate or subtruncate at base, obtuse or rounded at apex, 1.5–5 cm. long, 1.5–2.5 cm. wide, in type membranous, light green, coarsely dentate nearly from base, the teeth rounded, scabrous above, more or less pilose beneath, the nerves and veins prominent both sides; inflorescences axillary; bractlets lanceolate, long-acuminate, 2–3 mm. long, calyx about 1.5 mm. long and wide, strongly villous; corolla tube glabrous without, 5 mm. long, the limb about 3 mm. wide.—Leaves sometimes or finally firm, rugulose and obscurely cordate; compare *L. virgata.* As the well-chosen name indicates, this species resembles the subgroup of species once regarded as generically distinct when few entities had been discovered; Loesener, in herbaria, included it in *Lippia,* and Moldenke (while presuming to share publication) fails to say that Loesener even recognized *Aloysia!* To 1.5 meters tall, the white flowers rose-tinted (Goodspeed).

Lima: Above Chosica, *Ferreyra 759* (det. Moldenke); *Horton 10993* (det. *L. virgata* by Johnston). Surco, *Soukup 3741; Weberbauer 5206.* Near Sayán, Prov. Chancay, *Goodspeed 33022; 33025.*

Lippia americana L. Sp. Pl. 633. 1753; 579.

Sparsely strigose or glabrate; branchlets tetragonal, glandular punctate; leaves spreading or reflexed, ovate- or oblong-lanceolate, acuminate, crenate-serrate above the middle, the lower 7 cm. long, half as wide, gradually reduced, repand, membranous, pale green, scabrous above, sparsely strigose in the axils; heads pyramidately subglobose; bracts cuneate-obovate, abruptly cuspidate, subequaling the corolla, the lower little larger, all multinerved, little narrower

than the villous calyx, this about 1.5 mm. long, acutely bifid.—The Ecuadorian f. *hyptoides* (Benth.) Mold., Phytologia 4: 292. 1953 (*L. hyptoides* Benth. Pl. Hartw. 122. 1843), is possibly the Peruvian plant.

Piura: Huancabamba, *Weberbauer 6013*. Prov. Ayavaca, *Weberbauer 6346*.—Cajamarca: (Moldenke). To Mexico.

Lippia antaica Loes. & Mold. ex Mold. Phytologia 2: 19. 1941.

Branches acutely tetragonal, appressed-puberulent; petioles to 2 mm. long, often obscure, densely pubescent; leaves flabellate-subrotund, more or less truncate at base, rounded at apex, about 2 cm. long and wide at maturity (many smaller in the axils), chartaceous-subcoriaceous, evenly crenate revolute, scabrous and bullate above, puberulent on the prominent veins and densely pubescent beneath; peduncles erect, 5–10 mm. long, pubescent, 2 at each node, the capitate inflorescence about 8 mm. long, 1 cm. wide; bracts ovate, closely short-pubescent, 2.5–3 mm. long; corolla 4–5 mm. long, the limb about 3 mm. wide.—The locality is not certain.

Cuzco: Anta(?), *Weberbauer 5918*, type.

Aloysia ayacuchensis Mold. Phytologia 6: 323. 1958.

Shrub with slender tetragonous costate glabrate branches, floriferous twigs many, 3–8 cm. long; leaves crowded, opposite, oblanceolate, 6–10 mm. long, 1–3 mm. wide, membranous-chartaceous, entire, glabrous, pustulate above, resinous-punctate beneath, secondary nerves apparent only beneath; inflorescences 1–2 cm. long, puberulent; calyx 2 mm. long, corolla tube about 4 mm. long, exserted part white-puberulent, limb 3 mm. wide.—Type of this very distinctive species is in herbarium of Padre J. Soukup, and at the New York Botanic Garden. The author does not explain the species (?) distinctiveness.

Ayacucho: At 2,407 meters, (*Padre Loy 4187*).

Lippia betulaefolia HBK. Nov. Gen. & Sp. 2: 264. 1818. 583. *Phyla betulaefolia* (HBK.) Greene, Pittonia 4: 48. 1899.

Procumbent stems herbaceous, rooting toward base, the ascending tetragonal branches as the entire plant usually canescent appressed strigillose with bicuspidate eglandular trichomes; leaves rhombic-ovate, cuneately long-attenuate into the half to nearly as long petioles, acute, 3.5–7.5 cm. long, coarsely and acuminately serrate,

impressed pinnate-nerved and rugose; peduncles short, 1–3 in the axils; heads small, ovoid, finally oblong, the many almost minute flowers closely imbricated, little exceeded by the ciliate cuneate apically dilated and abruptly cuspidate bracts; calyx scarcely 0.7 mm. long; corolla pale rose, 1 mm. long.—Weed in cleared lands.

Loreto: Caballo-cocha, *Williams 2285; 2475* (det. Standley). La Victoria, *Williams 2970* (det. Standley).—Arequipa: (Moldenke). To Guiana; Paraguay.

Lippia ferruginea HBK. Nov. Gen. & Sp. 2: 265. 1818. 588.

More or less puberulent and ferrugineo-puberulent all over, also somewhat resinous glandular, even to the tubular compressed calyx —this 2 mm. long—and the 4 mm. long corolla; petioles 2–4 mm. long; leaves oblong-obovate, cuneate to 3-nerved base, 12–18 mm. long, half as wide, marginally reflexed, crenulate toward obtuse tip, lineate-rugose, slightly scabrous both sides on nerves as the younger sulcate branchlets; peduncles axillary, little incrassate above, shorter than the reflexing leaf, the heads at most 6-flowered; bracts strongly imbricate, subrotund-ovate, subacute, 1 mm. long; corolla puberulent without, glabrous in the throat, the stamens inserted there.—Perhaps the Vargas specimen is *L. Fiebrigii* but the leaves are crenulate. F.M. Neg. 17503.

Piura: Huancabamba, *Bonpland*, type; *Weberbauer 6066; Raimondi*.—Amazonas: (Moldenke).—Junín: (Moldenke).—Apurímac; Prov. Abancay, *Vargas 1462*.

Lippia Fiebrigii Hayek, Bot. Jahrb. 42: 165. 1908. *Aloysia Fiebrigii* (Hayek) Mold. Rev. Sudam. Bot. 4: 15. 1937.

Branches 4-angled, subpuberulent; petioles short; leaves little revolute, lanceolate, acute, 1.5–2 cm. long, 3–6 mm. wide, appressed scabrous setulose above, glandular punctate beneath; heads ovate, few-flowered, rather lax, foliose-bracted and racemosely approximate at tip of branches; ovate acute bracts and calyx subequal, the latter 2 mm. long; corolla more than twice longer than the calyx and, like the calyx and bracts, densely puberulent.—Belongs with *L. satureiaefolia* Mart. & Schauer, *L. boliviana* Rusby, and *L. turbinata* Griseb.; differs from the first in acute scabrous leaves, eglandular and entire bracts, from the third in entire leaves and differently pubescent bracts, and from the second, which it resembles most, in its smaller leaves and looser heads and in the entire not erose bracts (author).—May merge with *L. ferruginea* HBK. Type a meter shrub.

Apurímac: Oropeza Valley, *Vargas 9777*.—Ayacucho: (Moldenke). —Cuzco: Valle del Urubamba, along river, *Herrera 2230; Weberbauer 4910* (det. Hayek); 175. Calca, (*Vargas 248*). Bolivia.

Aloysia Herrerae Mold. Phytologia 2: 10. 1941.

Tetragonal rather slender branchlets glabrous and lustrous in age, obscurely puberulent at tip; nodes annulate; petioles 1–2 mm. long or obsolete; leaves entire, oblong or oblong-elliptic, acute both ends, about 1–4.5 cm. long, 3–10 mm. wide, chartaceous, bright green and very scabrous above with short bulbous-based trichomes, the trichomes shorter and also densely resinous-punctate beneath, the reticulation prominent only beneath; inflorescence axillary and terminal, the spikes 7–12 mm. long on slender peduncles 1–2 mm. long, these puberulent as the 2 mm. long calyces with flaring ovate teeth; corolla tube densely pubescent, 4 mm. long, the limb about 3 mm. wide.—Possibly a robust specimen of *L. Fiebrigii* Hayek and relatives with short peduncles. The type number distributed as *L. scorodonioides* HBK. or as *L. boliviana* Rusby; a remarkable species (author).

Cuzco: Valle del Urubamba, 3,000 meters, *Herrera 1534*, type (Field Museum). "Cedronsillo."

Lippia leptophylla Loes. in herb. *Aloysia leptophylla* Loes. & Mold. Phytologia 2: 11. 1941.

Tetragonal medullose branches, leaves both sides, peduncles (2–3 cm. long), axillary and terminal inflorescence more or less hirsute; leaves somewhat amplexicaul, ovate, cordate at base, rounded at apex, 2–5 cm. long, 1.5–4 cm. wide, membranous, coarsely dentate, the indument beneath in part a puberulence, the trichomes above weak, bulbous-based; spikes 5–8 cm. long, often subtended by a pair of dentate bracts 1 cm. long, 7 mm. wide; bractlets conspicuous, attenuate both ends, 5–6 mm. long, 1–1.2 mm. wide; calyx 3 mm. long, the teeth subulate-attenuate; corolla tube glabrous, 5–6 mm. long, the limb about 4 mm. across.

Ica: Valle Río de Pisco, *Weberbauer 5374*, type.

Aloysia minthiosa Mold. Phytologia 2: 12. 1941.

Slender branches and branchlets as well as subsessile subcoriaceous leaves (both sides) often obscurely but densely pulverulent-puberulent and resinous glandular especially when young, the many dense spikes (4–13 cm. long) including the calyces and corolla tube within puberulent; leaf-scars very prominent; leaves elliptic-ovate,

7–19 mm. long, 5–12 mm. wide, evenly and bluntly serrulate almost from base to obtuse apex, venation impressed only above; peduncles slender, to about 1.5 cm. long; bractlets 1–1.5 mm. long; calyx about 2, corolla 5 mm. long, the former unequally, the latter equally 4-lobed, its short tube puberulent within; stigma lobes minute.—Type from a small shrub in crevice of a cliff, the euphonious name referring to the minty fragrance of the white flowers. The original diagnosis is here reduced by half.

Ancash: Yautan, *2564*, type.—Lima: Without locality, fide author.

Lippia nodiflora (L.) Michx. Fl. Bor. Am. 2: 15. 1803; 585. *Verbena nodiflora* L. Sp. Pl. 20. 1753. *L. canescens* HBK. Nov. Gen. & Sp. 2: 263. 1818. *L. reptans* HBK. l.c. *Phyla canescens* (HBK.) Greene, Pittonia 4: 48. 1899. *P. nodiflora* (L.) Greene, var. *canescens* (HBK.) Mold. Phytologia 1: 98. 1934, var. *reptans* (HBK.) Mold. Alph. List Inval. Sci. Names Verb. 31. 1942.

Stems prostrate, more or less ligneous, intricately branched, minutely canescent-strigillose or scabriusculous as the leaves, these cuneate-oblanceolate or -obovate, sessile or shortly petioled, rarely 2 cm. long, entire or usually serrate toward the apex, sometimes obscurely nerved, ordinarily much exceeded by the nearly filiform peduncles; flowering heads oblong-ovoid, 3–7 mm. in diameter, cylindric in age; calyx often villous-compressed, with 2 ovate teeth placed laterally, entire or emarginate; corollas white, 1.5 mm. long, about 3 mm. wide; mature fruit black-punctulate, early globose, finally consisting of 2 parts.—Variable in pubescence and measurements, as probably most species will be found to be when correctly interpreted. The var. *reptans* (HBK.) Ktze., in *Phyla* (HBK.) Mold., refers to plants with thinner, often larger, elliptic, coarsely serrate leaves, the venation more prominent. Var. **rosea** (D. Don) Macbr., comb. nov. —*Zapania nodiflora* (L.) Lam. var. *rosea* D. Don in Sweet, Brit. Fl. Gard. ser. 2, 3: *pl. 225*. 1834, in *Phyla* (D. Don) Mold.—is usually densely matted and canescent-strigose all over, the small leaves cuneiform. Var. **strigulosa** (Mart. & Gal.) Macbr., comb. nov.—*L. strigulosa* Mart. & Gal. Bull. Acad. Brux. 11: 319. 1844; 584; *P. strigulosa* (Mart. & Gal.) Mold.—is the strigillose phase, the pinnate nerves strongly developed. In the Mexican type may be a local species, in Peru more or less similar and found (Moldenke) in Cajamarca, La Libertad and Lima.

The species sometimes forms mats several dm. in diameter often on seaside dunes and cliffs.

Piura: Negritos, *Haught 34*. Talara, *Haught 49*. Truxillo, (*Bonpland*, type, *L. canescens*).—Cajamarca: Nanchó, *Raimondi*.—Huánuco: Near Huánuco, *2336*.—Lima: Huara, *Soukup 1000*. Near Lima, *Raimondi; Ruiz & Pavón; 50; 51*. Callao, *5880* (var. *strigulosa*).—Ayacucho: *Raimondi*, (var. *reptans*).—Arequipa: Posco, Mejia, (*Günther & Buchtien 131; 131a*). Mollendo, *Raimondi*. Generally warm areas.

Lippia peruviana Turcz. Bull. Soc. Mosc. 36, pt. 2: 200. 1863. *Aloysia peruviana* (Turcz.) Mold. Rev. Sudam. Bot. 4: 15. 1937.

Tetragonous stems and branches finely pubescent; leaves attenuate to short petioles or subrounded at base, ovate, obtuse, crenate, punctate and minutely scabrous above, more pubescent and canescent beneath; spikes little exceeding the leaves, long-peduncled; calyx hirsute all over, the triangular acute teeth subequaling the tube, the corolla tube about three times longer than calyx.—After author, who noted that *L. scorodonioides* HBK. has smaller subrotund-elliptic leaves, acuminate calyx teeth, shorter flowers, and compared it also with several extra-Peruvian species.

Peru: Without data on type (*Mathews 585*); apparently also collected by Dombey (author).

Lippia scorodonioides HBK. Nov. Gen. & Sp. 2: 269. 1818; 573. *Aloysia scorodonioides* (HBK.) Cham. Linnaea 7: 234. 1832. *L. scorodonioides* HBK. var. *hypoleuca* Briq. Bull. Herb. Boiss. 4: 338. 1896, fide author.

Branches elongate, minutely pubescent or puberulent; leaves sometimes ternate, elliptic, often broadly, evenly crenate, shortly decurrent, quite obtuse, 1.5–3 cm. long, 12–18 mm. wide, rugose, pubescent but obscurely or not (typically) scabrous above, white tomentose beneath; peduncles solitary, axillary, subequaling the leaf; spikes dense, early 1.5–2.5 cm. long, becoming often much longer and lax; bracts linear, minute; calyx pilose-hirsute often all over, the teeth more or less subulate; corolla twice as long as the calyx, pale rose-colored, hirtellous, the throat villous.—The leaves are often marked with a beautiful fine rugose-venation and close crenulation; some of the following may represent the variant *L. spathulata* Hayek with smaller leaves. Near Lima occur the variants *Mathewsii* Briq. and *detonsa* Briq. l.c. 339 (*A. scorodonioides* var. *Mathewsii* (Briq.) Mold. Phytologia 1: 95. 1934, and var. *detonsa* (Briq.) Mold. l.c.), both with leaves scabrous above, lightly pubescent beneath, some-

what unevenly serrate, the first with spikes to 8 cm. long, calyx teeth not white pilose, the second with spikes 4–5 cm. long, calyx long-pilose all over. F.M. Negs. 24668 (var. *hypoleuca*); 24669 (var. *Mathewsii*).

Amazonas: *Mathews 3160* (type, var.).—Ancash: (Moldenke).—Lima: Matucana, *133; 357; Ferreyra 5420* (det. Moldenke); *Weberbauer 5399* (var.). Prov. Huarochiri, 2250 meters, *Goodspeed & Metcalf 30237* (var. *Mathewsii*). Surco, *Soukup 2718*. Río Chillón, *Pennell 14438* (var. *Mathewsii*, det. Moldenke).—Ayacucho: (Moldenke).—Apurímac: Oropeza Valley, *Vargas 9763* (det. Standley, *L. virgata*). Pincos, *Stork & Horton 10660* (det. Standley). Río Pachapacha, *Goodspeed Exped. 10541* (det. Standley).—Cuzco: Valle del Urubamba, *Herrera 3417; 1535; Vargas 11062*. Calca, *Vargas 160*. Prov. Paruro, *Vargas 9732* (det. Standley). Anta, *Vargas 3692*. Yucay, *Soukup 717*.—Puno: (Moldenke). Colombia to Argentina. "Cedroncillo" (Vargas), "lauraimana" (Herrera).

Lippia spathulata Hayek, Bot. Jahrb. 42: 165. 1908. *Aloysia spathulata* (Hayek) Mold. Phytologia 1: 95. 1934.

Branches quadrate, early sparsely puberulent; leaves spathulate-orbicular, obtuse, briefly narrowed into the short petiole, 1–1.5 cm. long, crenate, in type nervose-rugose and minutely scabrous-setulose above, puberulent-tomentose beneath; racemes erect, slender, finally lax, the rachis densely puberulent; bracts linear-lanceolate, little longer than calyx, this 2.5 mm. long, somewhat inflated in fruit, densely short-setose; corolla purple, subglabrous without, well-exserted.—Closely related to *L. scorodonioides* HBK. but distinguished by the small roundish leaves and especially by the sparser shorter pubescence of calyx (Hayek); could be an ecological phase; when I saw it at Dahlem I noted it as a small-leaved variant and collections (verified by Moldenke) have suboblong-elliptic glabrate not at all rugose leaves, calyces long-setose toward base, as *Pennell 13134*. A 1–3 meter shrub of rocky slopes at about 2,000 meters; flowers purple or tube lilac, lobes white (Pennell). F.M. Neg. 17547.

Cuzco: Valle del Urubamba, *Weberbauer 4911*, type; 175. Sillque to Calca, *Herrera 1670*.—Arequipa: Tiabaya, *Pennell 13079* (det. Johnston). Tingo, *Pennell 13134* (det. Johnston). Near Arequipa, *Weberbauer 6835; Goodspeed Exped. 22129*.

Lippia subterranea Rusby, New Sp. S. Am. Pls. 108. 1920. *Phyla subterranea* (Rusby) Mold. Rev. Sudam. Bot. 5: 2. 1938.

Suffrutescent, gray with appressed trichomes, creeping and rooting (fibrous roots many), the branchlets 1–3 cm. long, erect; leaves closely imbricate, oblanceolate, attenuate to sessile base, about 3 teeth each side toward obtuse tip, 1.5–2 cm. long, 3–6 mm. wide; heads terminal, finally a cm. long or longer and half as wide; bracts 3 mm. long and about as wide, base nearly half as long, rounded apex ciliate, mucronate; calyx campanulate, compressed; corolla 3 mm. long, tube abruptly contracted at base, upper lip nearly twice as long as lower, the very broad upper lip dentate, the lower with 3 spreading lobes.—In dense mats in sand, the flowers blue (collector).

Arequipa: Mollendo, (*R. S. Williams 2933*, type).

Lippia tayacajana Mold. Phytologia 2: 21. 1941.

Striate slender branches shortly pubescent toward tips, soon glabrous, in age the bark somewhat shredding; leaves crowded, oblanceolate, strongly narrowed to base (obscurely petiolate), rounded or subacute, about 1–2 cm. long, 4–8 mm. wide, firm, minutely and closely canescently scabrous-strigillose above, densely short-pilose or somewhat tomentulose beneath, vein-reticulation prominent above, secondaries conspicuous beneath, serrulate from about the middle, slightly revolute; peduncles solitary, about a cm. long, the heads scarcely 5 mm. long and broad; bractlets lanceolate, acute, appressed strigose, about 4 mm. long; corolla 5 mm. long, the tube 2 mm. wide. —Related to *L. ferruginea* HBK. (author); type about 1 meter tall.

Huancavelica: Near Pampas, Río Mantaro, Prov. Tayacaja, *Weberbauer 6510*, type.—Cajamarca: *Weberbauer 7125*.

Lippia triphylla (L'Hér.) Ktze. Rev. Gen. Pl. 3, pt. 2: 253. 1898; 574. *Verbena triphylla* L'Hér. Stirp. Nov. 21. *pl. 11*. 1784. *Zapania citr(i)odora* Lam. Tabl. Encycl. 1: 59. 1791. *L. citr(i)odora* (Lam.) HBK. Nov. Gen. & Sp. 2: 269. 1818. *Aloysia triphylla* (L'Hér.) Britton, in Britt. & Wils. Sci. Survey Puerto Rico 6: 140. 1925.

Glabrous or nearly except lightly scabrous on the striate branchlets, the 3–4-verticillate leaves above and the axillary verticillate spikes somewhat pubescent; leaves lanceolate, often narrow, entire or medially serrate, acute, densely glandular punctate beneath; spikes slender, sometimes in a terminal panicle; calyx tubular, slightly bilabiate; corolla white or bluish.—Lemon-scented or sweet verbena of gardens, commonly cultivated as a substitute for the beverage tea (*Thea sinensis*).

Ancash: Huaraz, Baños de Chancos, *Sandeman 4612*.—Lima: Near Lima, (*Soukup 1774*).—Huánuco: Mito, *1641*.—Ayacucho: *Stork & Horton 10797*. "Cedrón." Chile.

Lippia turbinata Griseb. Pl. Lorentz. 195. 1874.

Rigidly branched shrub, the subtetragonal younger branches early asperous, estriate; leaves ternate or opposite, with a fascicle of much reduced leaves in each axil, lanceolate, attenuate to the short petiole, very acute, 2–3 cm. long, 3–6 mm. wide, rigid coriaceous (twisted or flexible in drying), dentate only above the base, asperous hirsute above (trichomes callus-based), appressed pubescent beneath on the rather prominent nerves, otherwise subglabrous; heads solitary, 3.5–5 mm. long, 4–6 mm. thick, turbinate in fruit and to 1 cm. long, the peduncles 2–4 mm. long; bracts multiseriate, imbricate, outer lanceolate, inner lanceolate-subulate to oval, rigid, medially pubescent, subglabrous apically, medial nerve conspicuous; calyx more or less 2-cleft, densely pubescent, the segments linear-lanceolate, 1.5–2 mm. long; corolla white, the tube 2.5–2.8 mm. long, scarcely exceeding the bracts, pubescent and glandular punctate on the upper third, the lips 3-lobulate, largest medial lower, to 1.5 mm. long; filaments from middle of tube, style less than 1 mm. long; fruit 2 mm. long, seed obovoid.—After N. S. Troncoso, Darwiniana 10: 80. 1952, who notes that leaves may vary to obovate, bracts smaller, ovate and apiculate, heads sometimes geminate, but the significance of these variations is not yet known. Illustrated, Troncoso, l.c. 82 (branch, flower and fruit in detail).

Tacna: (Moldenke). Chile; Argentina.

Lippia virgata (R. & P.) Juss. Ann. Mus. Paris 7: 73. 1806; 573. *Verbena virgata* R. & P. Fl. Peruv. 1: 20, *pl. 32b*. 1798. *Aloysia virgata* (R. & P.) Juss. Ann. Mus. Paris 7: 73. 1806. *A. urticoides* Cham. Linnaea 7: 238. 1832.

Branches strict, lenticellate, subterete, glabrous; leaves usually ovate or oblong, to about 7 cm. long, half as wide, attenuate to petiole, acute or acuminate, crenate or serrate, pinnate-nerved-rugulose, membranous, subcallous-asperous above, cinereous-tomentose beneath; racemes at base of axillary branchlets or paniculate, scarcely peduncled, elongate; calyx tubular, pilose-hirsute below, semi-4-cleft, the subulate-cuspidate teeth hispid-scabrous.—The variant *elliptica* Briq. (*A. virgata*, var. *elliptica* (Briq.) Mold.), leaves obtuse or rounded, decurrent and entire at base, has been found in Cuzco,

fide Moldenke. My collection from a stream-bank shrub-tree 4 meters tall, the white flowers fragrant; known to attain 8 meters, the crown spreading, trunk columnar, bark pale yellow-brown with long coarse fissures, flowers white or with a violet hue, wood used only for fuel (Williams, Field Mus. Bot. 15: 438. 1936). F.M. Neg. 24658 (an ined. name after Pavón).

San Martín: Tarapoto, *Williams 5565* (det. Standley).—Huánuco: Pozuzo, *Ruiz & Pavón*, type.—Junín: La Merced, *5305* (det. Johnston).—Apurímac: Oropeza Valley, *Vargas 9763* (det. Standley).—Cuzco: Machu-Picchu, 2,400 meters, *Herrera 3258*. Alto Río Urubamba, *Diehl 2425* (det. Standley). Prov. del Cercado, 3,450 meters, *Herrera 1925*. To Brazil and Argentina. "Chicharra caspi" (Williams).

5. BOUCHEA Cham.

References: Moldenke, Repert. Sp. Nov. 48: 16–29. 1940; 49: 91–139. 1940; Grenzebach, Ann. Mo. Bot. Gard. 13: 71–100. 1926.

Herbs or more or less ligneous, the leaves rarely entire, the terminal spikes or racemes rarely short. Flowers obscurely if at all pedicellate, usually borne laxly and the bracts small. Calyx narrowly tubular, the 5 prominent ribs more or less extended. Corolla tube slender, the oblique limb with 5 frequently unequal or subequal lobes. Stamens 4, didynamous, inserted medially or higher, the anthers with parallel cells. Ovules usually solitary, erect from base, the cells 2. Style filiform, the clavate stigma with a posterior tooth or tubercle. Fruit dry, shortly or not exserted, oblong or linear, separable into 2 cocci.—Named meritoriously for Peter Carl and Carl David Bouché, father and son, eminent horticulturists at the noted Schöneberg Garden, Berlin, in the nineteenth century. Name conserved. Moldenke, l.c. 119, quotes from correspondence between St. Hilaire and Kunth which shows, interestingly, that the observing and extremely able French botanist was deterred by his friend from proposing a new genus based on his *V. pseudogervao*, six years before Chamisso's segregation was published.

Bouchea fluminensis (Vell.) Mold. Repert. Sp. Nov. 49: 117. 1940. *Verbena fluminensis* Vell. Fl. Flum. 1: 17. 1825; Icones, *pl. 38*. 1827; 117.

Herb or woody below with purple to white flowers, sometimes a meter high, glabrous or slightly pubescent particularly the racemes, these 1–3 dm. long, leaves ovate to elliptic-oblong, coarsely mucro-

nate-dentate down to the cuneate base, acuminate, pale beneath; flowers subsessile; bracts linear-lanceolate, about 5 mm. long, the bractlets about a third as long; calyx 10–13 mm. long, finely pubescent; cocci basally coherent, subcylindric, 12–13.7 mm. long, 1.5–2 mm. wide, a little exserted, beak (2.5 mm. long) short or obscure, dorsally ridged base to apex, the commissural surface smooth, plane or somewhat concave.—The similar *B. prismatica* (L.) Ktze., 97, probably extending into Peru from northern South America, has calyx 5–9 (10) mm. long, the 2 cocci separating, about 7.5 mm. long, beak 1–1.5 (3) mm. long, dorsal surface often smooth, commissural often rough. Too many collections have been made of this weedy plant. Illustrated, Grenzebach, l.c. *pls. 9–11, figs. 11–24* (fruits).

San Martín: Tarapoto, *Goodspeed Exped. 35004; 35105; Williams 5469; 5561; 5808; Woytkowski 35004.* Juanjuí, *Klug 3904; 4206.*—Junín: La Merced, *5304.* Puerto Bermudez, *Killip & Smith 26625.*—Loreto: Balsapuerto, *Klug 2839.*—Cuzco: Valle Lares, *Diehl 2429.* Prov. Convençión, *Soukup 800.* Ecuador and Brazil. "Pacunga," "pakungua" (Woytkowski).

6. STACHYTARPHETA Vahl

Similar vegetatively to *Bouchea*, to which students have allied it, but with only 2 perfect stamens and the anther cells divaricate, the stigma orbicular-subcapitate and the ovules laterally affixed near the base. Leaves sometimes alternate. Pubescence villous, pilose or lacking.—St. Hilaire, as quoted by Moldenke (see *Bouchea*) asserted his disbelief in the separation of this genus; and no wonder in view of his experience. The conserved name of Vahl supplanted *Valerianodes* [Boerh.] Medic.

Spikes filiform or slender, the rachis and grooves subequal in width.

Corolla tube about 1 cm. long.

Leaves more or less decurrent; corolla tube more or less exserted. *S. cayenensis.*

Leaves long-decurrent; corolla tube well-exserted. . *S. peruviana.*

Corolla tube about 2 cm. long. . . . . *S. quirosana.*

Spikes to 2 cm. thick; rachis incrassate.

Leaves ovate or subrotund, coarsely serrate. . . . . *S. canescens.*

Leaves oblong-elliptic, serrulate, more or less attenuate to base. *S. Weberbaueri.*

Stachytarpheta canescens HBK. Nov. Gen. & Sp. 2: 281. 1818; 565.

Subdichotomous, the stems and leaves somewhat viscid tomentose-lanate or hirsute-villous, the branches quadrate; leaves subsessile, ovate or subrotund, about 3.5 cm. long, 2–2.5 cm. wide, coarsely acuminate-serrate, rugose; spikes slender, finally incrassate, elongate, the flowers recurved-spreading, the calyx in fruit appressed, 6 mm. long; bracts firm, scarious-margined, subulate, subaristate, as long as or shorter than the acutely 4-dentate calyx, the longer corolla blue.—Variable in abundance of indument, especially in spike, sometimes sparsely glandular; *S. Weberbaueri* may be found to be a part of this species.

Cajamarca: Near Sarta (Truxillo), *Bonpland*, type. Brazil.

Stachytarpheta cayenensis (Rich.) Vahl, Enum. 1: 208. 1804; 562. *Verbena cayenensis* Rich. Act. Soc. Hist. Nat. Paris 1: 105. 1792. *Verbena dichotoma* R. & P. Fl. Peruv. 1: 23, *pl. 34*. 1798. *S. dichotoma* (R. & P.) Vahl, l.c. 207, fide Moldenke (at some time). *S. umbrosa* HBK. fide Moldenke (at some time).

More or less dichotomous, the branches early, especially at nodes, lanate; leaves somewhat decurrent into petiole, ovate or ovate-oblong, acute or acuminate, coarsely serrate, or subincised, 2.5–10 cm. long, about half as wide, glabrous to scabrous-hirtellous or strigillose especially on the nerves beneath; spikes elongate, slender, the flowers erect in age; bracts subulate, aristate, scarious-margined; calyx 4-costate-plicate, about 4–6 mm. long; corolla blue, scarcely or somewhat exserted, the limb small.—Rachis and grooves each about the same width; in the similar and widely distributed *S. jamaicensis* (L.) Vahl the latter are narrower than the former. Richard wrote "cayennesis."

San Martín: Tarapoto, *Goodspeed Exped. 35017* (det. Moldenke). Lamas, *Williams 6475*.—Huánuco: Cuchero and Chinchao, *Ruiz & Pavón* (type, *V. dichotoma*).—Loreto: Río Itaya, *Williams 35*.—Cuzco: Valle del Urubamba, *Herrera 3480*. Widely distributed in warm America.

Stachytarpheta peruviana Mold. Phytologia 1: 473. 1940.

Perennial herb, the type about 1 meter high, obtusely angled, glabrous or essentially, the slender branches and thin-membranous bright green leaves lustrous, the spikes to 3 dm. long and very slender; leaves long-attenuate into alate indistinctly defined petiole (about 1 cm. long), ovate, acute, 8–10 cm. long, 4–5.5 cm. wide,

the expanded portion coarsely serrate with broad subacute minutely apiculate teeth; secondaries slender, 5–7 each side; peduncles very short or obsolete; rachis glabrous; bractlets lanceolate, 4 mm. long, long-acuminate, scarious-margined near base; fruiting calyx rather deeply impressed; corolla pinkish-blue, the slender tube 7 mm. long, the limb about 4 mm. wide.—A distinctive species (author); cf. *S. cayenensis* (Rich.) Vahl.

Ayacucho: Edge of forest, along beach, Río Apurímac Valley, *Killip & Smith 22853*, type (det. Standley, *S. cayenensis*).

Stachytarpheta quirosana Mold. Phytologia 1: 457. 1940.

Shrubby, the slender branches sparsely subappressed pilose as the thin-chartaceous dark green leaves above; nodes annulate; petioles subobsolete or to 5 mm. long; leaves ternately fasciculate, usually also with several smaller ones on greatly abbreviated twigs in their axils, elliptic or obovate, long-cuneate at base, acute, 2.5–7.5 cm. long, 1–3.2 cm. wide, densely short-pubescent beneath, not scabrous above, regularly serrate at least from about the middle; secondary nerves very slender, 5 or 6 on each side; spikes terminal, solitary, about 1.5–5 dm. long, the flowers imbricate above; rachis short, slender, 2–5 mm. thick, appressed pilose, deeply excavated; bractlets lanceolate, attenuate-filiform; corolla tube 2 cm. long, the limb 1–1.5 cm. in diameter.

Piura: Valley of the Quiros, *Weberbauer 6343*, type.

Stachytarpheta Weberbaueri Mold. Phytologia 1: 477. 1940.

Shrubby with acutely (even subalate) tetragonous densely puberulent branches and peduncles, these to 2 cm. long, annulate nodes, chartaceous subsessile regularly serrulate elliptic leaves, tomentulose on both sides and shortly pubescent spikes very densely flowered for 7–25 cm., the rachis deeply excavated, densely short pilose; leaves long-attenuate to petiolar base, acute or subacute, about 2–4 cm. long, half as wide, the 5–7 secondary nerves subprominent beneath, the veinlet reticulation abundant; bractlets oblong-elongate, about 1 cm. long; corolla about 2 cm. long.—Spikes are to 2 cm. thick.

Cajamarca: Between Tabacamos and Marañon valleys, 1,200 meters, *Weberbauer 6178*, type. Sucse River, *Stork & Horton 10092*.

7. **PRIVA** Adans.

Reference: Moldenke, Rep. Sp. Nov. 41: 1–76. 1936; Phytologia 5: 73–80. 1954.

Decumbent to erect often pubescent herbs marked by a tubular 5-costate, 5-dentate calyx strongly accrescent and usually dilated in fruit and contracted at throat. Spiciform racemes terminal or axillary, the soon laxly borne small subbilabiate flowers early often essentially sessile. Stamens 4, didynamous, medially affixed; anther cells slightly or not divergent. Ovary cells 4 (Moldenke) as basal erect ovules or by abortion 2-celled. Style filiform, unequally 2-lobed, the minute stigma at tip of larger lobe (Moldenke). Fruit included, with two 2-celled echinate nutlets or sometimes 1-celled.—Kobuski, Ann. Mo. Bot. Gard. 13: 1–34. 1926, gave a concise revision with many fine figures; Moldenke, as indicated, has revised or reinterpreted several observations of earlier students.

Stems as petioles pilose; cocci quadrangular.....*P. lappulacea.*
Stems as petioles puberulent; cocci subspheroid.....*P. peruviana.*

Priva lappulacea (L.) Pers. Syn. Pl. 2: 139. 1806; 24. *Verbena lappulacea* L. Sp. Pl. 19. 1753.

Glabrous or somewhat pilosulous except toward base; petioles to 3 cm. long; leaves ovate, subtruncate or subcordate at base, acute or acuminate, coarsely subappressed serrate, mostly several–many (14.5) cm. long, nearly half as wide, membranous, sparsely pilose-strigose above, pale and scattered pilose-puberulent beneath; racemes to 2 dm. long, linear-setaceous bractlets (prophylla) 1–2.5 mm. long; calyx 2–3 mm. long, in fruit 5–7 mm. long, the trichomes uncinate; corolla variously tinted, tube about 3.5 mm. long, largest lobes 1.8 mm. long; fruit quadrate, the united ligneous cocci 3 mm. long, 2 mm. wide, inner (commissural) surface flat or nearly, plane, not margined, dorsally with 2 rows of acute or spinose tubercles and obscurely roughened between them.—Illustrated, Kobuski, l.c. *pl. 4, fig. 10* (fruit); *pl. 5, fig. 19* (calyx).

A weedy plant decumbent-ascending, to even a meter tall, doubtless growing in other than the following departments.

Tumbez: Ricaplaya, *Weberbauer 7737.*—Cajamarca: *Raimondi.*—Lima: *Esposto.*—Huánuco: (*Asplund 12096*).—Junín: La Merced, *5296.*—Loreto: Río Nanay, *Williams 397.* Río Itaya, *Williams 291.* Yurimaguas, *Williams 4428.* Iquitos, *Klug 1238.* Most of warmer America.

Priva peruviana Mold. Repert. Sp. Nov. 41: 23. 1936.

Stems, branches, petioles (4–10 mm. long) and leaves beneath more or less puberulent, glabrate in age; leaves ovate, uniformly

appressed serrulate, broadly rounded to acute base, acute, about 2–4 (4.3) cm. long, 7–2 cm. wide, strigillose above; racemes very lax, 3–19 cm. long, the 4–22 flowers often pseudo-secund; pedicels 1–2 mm. long; calyx about 5.5 mm. long, to 7 mm. long in fruit, uncinate-puberulent; corolla tube 5.2 mm. long, largest lobe about 1.8 mm. long; fruit obovoid-spheroid, long-attenuate at base, each nutlet finally 5–5.5 mm. long, 2 mm. wide, dorsally echinate in 2 series (or 1 row reduced), also reticulate-rugulose, the inner surface excavated and clearly margined.—Suggests *P. portoricensis* Urban, but different (author); otherwise, presumably, the new name would not have been published.

Cajamarca: *Raimondi 396*.—Amazonas: Chachapoyas, (*Mathews 3158*, type).

8. CASTELIA Cav.

Priva Adans., section *Castelia* (Cav.) Briq. Pflanzenfam. 4, Abt. 3A: 155. 1897.

Reference: Moldenke, Phytologia 6: 232–241. 1958.

Differs from *Priva* especially in the thick hard merely rugulose pyrenes (Briquet) and in the (in part) verticillate flowers, tuberous roots (Moldenke).—Kobuski, following Briquet and Rusby, included it in *Priva*, which classification indicates its closest living affinity, but in floristic work it conveniently may be considered a separate entity; moreover, Moldenke listed (after Miers and others) 12 contrasting characters, notably, the calyx not globosely dilated in fruit, corolla-tube veins straight, staminode present, nutlets joined in fruit. The name recalls Juan de Dios Castel, Spanish companion of Loefling on his trip up the Orinoco.

Castelia cuneato-ovata Cav. Anal. Sci. Nat. 3: 134. 1801; Icones 6, *pl. 583*. 1801. *Priva cuneato-ovata* (Cav.) Rusby, Bull. Torrey Club 27: 80. 1900. *P. laevis* Juss. Ann. Mus. Paris 7: 70. 1806.

Somewhat succulent, a few dm. high, little branched, the broadly ovate leaves, often with small ones in their axils, narrowed to short petioles, obtuse or acute, crenate-serrate, 3–8 cm. long, 1–4 (5) cm. wide, glabrous or slightly puberulent; bracts (prophylla) oblong-lanceolate, 4–7 mm. long; flowers scattered or mostly verticillate, sessile or subsessile; calyx purplish-striped, finally about 1 cm. long, 2-lipped, the acuminate teeth involute and contorted over fruit; corolla more or less bilabiate, purple to reddish, lilac or nearly white,

the tube curved; anthers cordate or sagittate; stigma simple, uncinate; fruit drupaceous, indehiscent, the 2 cells covered by a dorsal rather corky mesocarp surrounded by a thick pith, the 2 osseous nutlets (pyrenes) about half immersed, convex dorsally, 2-sulcate within (after Moldenke who as usual describes carefully and completely in detail).—Tuber edible, white (Eyerdam) at the end of a long string of fibrous roots, the flowers fragrant (Balls); corolla white, the tube purplish (Metcalf). Illustrated, Kobuski, Ann. Mo. Bot. Gard. 13: *pl. 4, fig. 12* (fruit); *pl. 5, fig. 21* (calyx).

Ica: *Scolnik 1032.*—Tacna: Road to Calientes, *Metcalf 30350.* In fields near Tacna, *Eyerdam 24646;* (*Raimondi 1813; Rusby 2531; Shepard 269*). Chile; to Argentina.

9. **PETREA** [Houstoun] L.

Reference: Moldenke, Repert. Sp. Nov. 43: 1–48, 161–221. 1938.

Scandent or arborescent, glabrous or more or less scabrous with somewhat lenticellate branchlets and generally coriaceous opposite or whorled leaves, often purple flowers in terminal and upper axillary usually elongate racemes, the frequently beautifully colored enlarged calyx lobes most conspicuous at anthesis, rather green in age. Calyx tube commonly 5- or 15-costate, ordinarily exceeded by the membranous finally reticulate mostly equal lobes, these at base with a thin sinuate 5-dentate or 5-cleft crown or corona. Corolla tube short, the usually oblique rotate limb with 5 often unequal lobes. Stamens 4, didynamous, medially affixed; anther cells parallel, the connective generally enlarged. Ovary more or less imperfectly 2-celled, the single ovule lateral, ascending or pendent. Calyx in fruit indurate, the lobes accrescent, the enclosed fruit indehiscent, usually with two 1-seeded stones.—Camp, as reported in detail by Moldenke, l.c. 12, determined by anatomic studies that the small calyx lobes alternate to the large ones are appendages and not remnants (formerly considered incorrectly an epicalyx); Moldenke terms these (entire, dentate or divided) the calycinal crest. Several of the species defined by him are not (at least from his presentation) clearly contrasted, their characters seemingly within the range of reasonable or expected variations.

Often cultivated for its showy inflorescence; named by Houstoun (according to Moldenke) for the eminent early eighteenth century floriculturist of England, Petre, said to have first grown *Camellia japonica* in Europe. Besides *P. volubilis* L., *P. arborea* HBK. and

P. Kobautiana Presl may be grown in Peru; both have basally rounded to connate leaves, the former with hirsutulous, the latter puberulent calyx, often glabrous or obscurely scabrous leaves.

KEY TO PETREA (after Moldenke)

Calyx tube hirsute or tomentose, 3–6 mm. long.
  Calyx lobes finally about 1 cm. long; anther connective glabrous. *P. pubescens.*
  Calyx lobes about 2 cm. long; anther connective pilose. *P. volubilis.*
Calyx tube, if developed, short-pubescent or puberulent.
  Calyx tube (mature) 8–9 mm. long ..... *P. macrostachya.*
  Calyx tube shorter or obsolete, or about 2–6 mm. long.
    Calyx lobes (mature) to 36 mm. long, 17 mm. wide. *P. peruviana.*
    Calyx lobes about 1.5–2 cm. long, 5–10 mm. wide.
      Leaves coriaceous, smooth, lustrous above; calyx tube to 5 mm. long ..... *P. nitidula.*
      Leaves more or less scabrous (as to types).
        Calyx tube to 2 mm. long; leaves membranous-chartaceous. *P. atrocoerulea.*
        Calyx tube 3–5 mm. long; leaves often subcoriaceous.
          Calyx lobes subobovate; leaves finally strongly bullate-venose ..... *P. Martiana.*
          Calyx lobes suboblong to obovate in age; leaves slightly or laxly venose ..... *P. peruviana, P. maynensis.*

Petrea atrocoerulea Mold. Repert. Sp. Nov. 43: 195. 1938.

Younger branchlets short-pubescent, petioles (5–12 mm. long), peduncles (1–3.5 cm. long) and pedicels (1.5–3 cm. long) more or less puberulent; leaves opposite, entire, broadly elliptic, about 7–17 cm. long, 3–11 cm. wide, at maturity gray-green, firm-membranous, obscurely scabrous both sides and somewhat rugulose beneath, the 7–10 pairs of lateral nerves and densely reticulate veins prominent beneath; inflorescence axillary and terminal, to about 4 dm. long; bractlets 4–7 mm. long; calyx glabrous, the tube about 4 mm. long, 5 mm. wide at top, not costate but rugulose at base, the subovate lobes about 1.5 cm. long, 4 mm. wide above, the basally cleft crest with acute lobes 2 mm. high; corolla tube about 13.5 mm. long,

sparsely puberulent toward apex where 1 cm. across, densely pubescent within, the largest of the puberulent obovate lobes nearly 1 cm. long; anther connective densely long-pilose; calyx tube in fruit to 5.5 mm. long, lobes to at least 4 cm. long, the callose crest converging inward.

Peru: Without data, *Ruiz & Pavón.* Colombia; Brazil.

Petrea macrostachya Benth. Ann. Nat. Hist. ser. 1, 2: 448. 1839; 204.

Resembles in general *P. volubilis* L. but indument entirely a puberulence especially dense only on the younger branchlets and petioles; leaves broadly elliptic or ovate-elliptic, entire or sinuate, rounded or acute at base, obtuse, emarginate, sometimes apiculate, to about 2 dm. long and half as wide or smaller, ordinarily obscurely asperulous or glabrate, not bullate; inflorescence axillary or terminal, about 2.5–6.5 dm. long, nutant on peduncles 1–3 cm. long (or shorter), often with 2–5 pairs of sterile bractlets; pedicels about 1.5 cm. long, sparsely puberulent; calyx 7–10 mm. long, subglabrous, the obovate lobes about 1 cm. long, 4–4.5 mm. wide, the crest united for 4 mm., its lobes 1 mm. long, glabrous; corolla tube to 12 mm. long, rather sparsely hirsute within, the largest lobe 4.5–11 mm. long; anthers short pilose; fruiting calyx indurate, strongly 10-plicate-costate, to 9 mm. long, the lobes to 27.5 mm. long, the callose crest converging inward.—Stem said to attain 1 dm. in diameter, corolla violet-purple, calyx pale blue. F.M. Neg. 34292.

Loreto: Fide Moldenke, Phytologia 4: 451. 1953. To Guiana.

Petrea Martiana Schauer in DC. Prodr. 11: 620. 1847; 164.

Branchlets, stout petioles (mostly 1–2 cm. long), peduncles (to about 1 dm. long), pedicels (9 mm. long) and rachis more or less densely fulvous puberulent; leaf-scar bases 2–4 mm. long; leaves entire, broadly elliptic, usually acuminate, acute or rounded at base, about 1–2 dm. long, rather more than half as wide, sometimes larger, firm-membranous or subcoriaceous, sometimes rather lustrous above, densely asperulous both sides and somewhat hirsutulous on the prominent venation beneath, at maturity conspicuously bullate; racemes solitary, but approximate toward branchlet tip, about 2.5–4.5 dm. long; calyx tube 4–5 mm. long and as broad at apex, 15-costate, densely short-pubescent, the thin-membranous obovate rounded or acute glabrous lobes 14–17 mm. long, 3 mm. wide at base, to 1 cm. wide above, the crown-like crest about 1.5 mm. high, the lingulate

obtuse lobes 1 mm. long; corolla tube 5 mm. long, upper fourth spreading puberulent without, long-pubescent within to just below stamens, the lobes all rotund, puberulent; calyx in fruit to 7 mm. long, lobes to 3 cm. long, callose.—Liana, the flowers violet (Ducke). Illustrated, Mart. Fl. Bras. 9, *pl. 46*.

Loreto: Without data, *Fox 96*. Amazon; Brazil.

Petrea maynensis Huber, Bol. Mus. Paraense 4: 602. 1906; 199.

Resembles most perhaps *P. pubescens*, the leaves similar in form and rarely opposite but rather lightly asperulous, not at all pubescent, the early pubescent branchlets soon glabrate, petioles puberulent, 4–10 mm. long, pedicels (about 9 mm. long) and calyx glabrous; leaves to about 2 dm. long, nearly half as wide, often acute both ends, lateral nerves (especially) prominent beneath; racemes to 4.5 dm. long; peduncles very short if apparent; sterile bractlets persisting; calyx tube 3.5–4 mm. long, 10-ribbed, the lobes oblong, 12.5–14 mm. long, 2.5–4 mm. wide, the crest 5-cleft to base, the acute segments 3 mm. long, half as wide; corolla tube 9 mm. long, to 7 mm. wide at apex, short-pilose (as lobes) from base, sparsely pubescent above within, largest lobe 7.5 mm. long; anthers glabrous, connective erect; fruiting calyx to 5.5 mm. long, 8 mm. wide, lobes about 2.5 cm. long, crest converging.—As in *P. volubilis* L. there are often axillary fascicles of bractlets. *P. longifolia* Mold. l.c. 197, origin unknown, is similar but leaves to 3 dm. long, short acuminate, glabrate, and anther connective recurved. Calyx nearly white, corolla violet (Ducke); calyx blue, corolla center white (Kuhlmann).

San Martín: Tocache, *Poeppig 1970*.—Huánuco: Fide Moldenke. —Loreto: Between Contamana and Canchahuaya, (*Huber 1489*, type). Río Ucayali, (*Tessman 3960*). To Colombia; Brazil; Bolivia.

Petrea nitidula Mold. Repert. Sp. Nov. 43: 168. 1938.

Rather similar to *P. Martiana* but less pubescent, the branchlets and petioles (5–12 mm. long) more or less minutely puberulent, the leaves somewhat lustrous both sides, glabrous and smooth above, rather densely scabrous and rugulose only beneath, the pedicels (8 mm. long, 2 cm. long in fruit) puberulent; calyx 10-ribbed, the lobes oblong, to 2 cm. long, 3–5 mm. wide, the crest cleft to base or early weakly united, about 1.2 mm. high; corolla tube 16 mm. long, the lobes oblong, sparsely puberulent; calyx tube in fruit 6 mm. long, lobes to 2.8 cm. long, crest converging.—Corolla said to be

blue, the calyx paler; has been confused with *P. Martiana* Schauer (author); cf., however, smooth specimens of *P. peruviana.*

San Martín: (*Poeppig*). Amazonian Brazil.

Petrea peruviana Mold. Repert. Sp. Nov. 43: 206. 1938.

Branchlets, opposite leaves, petioles (1–1.5 cm. long), and terminal lax inflorescence including the calyx tube minutely or obscurely puberulent; leaves entire, broadly elliptic, obtuse both ends or rounded basally, emarginate apically, 6–18 cm. long, 3–10.5 cm. wide, firm-membranous, faintly scabrous or glabrous both sides, the 8–15 pairs of secondary nerves prominent, especially beneath; racemes to 3 dm. long or longer, developed after the leaves; pedicels about 2 cm. long, often with a medial bract; calyx tube 6–6.5 mm. long, nearly as wide at top, smooth but weakly 10-ribbed, the membranous obovate acute lobes 16–21.5 mm. long, 6–8 mm. wide above, crest cleft to base, the segments obtuse, 1.5 mm. long; corolla tube 15–18 mm. long, ampliate to about 10–14 mm. across, only the upper fourth puberulent, long-pubescent within, the lobes broadly elliptic, the largest 8–11 mm. long, puberulent all over; anther connective pilosulous; fruiting calyx lobes to 3.5 cm. long, 1.5 cm. wide, the very callose crest converging. —With *P. nitidula* seems doubtfully distinct from *P. maynensis*, considering some variability. The var. *acuminata* Mold. has leaves to 23 cm. long, long- or short-acuminate, usually acute at base and calyx crest merely sinuate. Collectors noted it as a shrub or a liana, flowers dark blue or violet; may become scandent above in age or when support is at hand.

Loreto: Iquitos and vicinity, *Klug 637*, type; *170;* (*Mexia*, type, var.); *Williams 8106; Mexia 6498* (var. *acuminata*). Río Nanay, *Williams 647* (var.); *690.*—Puno: Lake Titicaca, (*Meyen*). Ecuador; Colombia. "Sanango-sacha" (Williams).

Petrea pubescens Turcz. Bull. Soc. Imp. Nat. Mosc. 36, pt. 2: 211. 1863; 170.

Slender branchlets early fulvous or yellowish hirsutulous as the petioles—these opposite or often 3–4-verticillate, 1–5 mm. long—and young leaves that ordinarily precede the blue flowers; leaves elliptic or slightly obovate, entire or repand-sinuate, attenuate to the acute to rounded or subcordate base, rounded or obtuse and usually mucronulate, the largest 1.5 dm. long, at least about a third as wide or even larger, asperulous both sides, finally firm membranous and bullate, the lateral nerves 7–15 pairs; racemes many, crowded apically, to 2 dm. long or longer, nutant; pedicels and obconic calyx

tube strongly long-pubescent, the latter 3–3.5 mm. long, the glabrous obovate lobes 12–13 mm. long, 3–5 mm. wide above, the acute ciliate crest lobes 1.5 mm. long; corolla tube 6–7 mm. long, puberulent above, long-pubescent within; anthers glabrous; calyx in fruit to 6 mm. long, lobes to 22 mm. long, callose crest converging, dorsally setose-hispid.—The var. *Klugii* Mold., l.c. 172, has the mature calyx about 3 mm. long and densely divaricate-tomentose. Shrub or tree, recorded to 20 meters tall, or sometimes said to be a liana. F.M. Neg. 34291.

San Martín: Chazuta, *Klug 4155* (type, var.; det. Standley, *P. arborea* HBK.).—Río Acre: *Ule 9722*. Colombia; Venezuela.

Petrea volubilis L. Sp. Pl. 626. 1753; 32.

Liana or early erect, lenticellate subterete branches and branchlets subappressed or early spreading pubescent as petioles (4–13 mm. long), peduncles (to 7 mm. long, or these puberulent), and calyces; leaf-scars prominent, corky based; leaves elliptic, usually entire, generally acute or obtusely narrowed at base, acute or shortly acuminate, to about 2 dm. long, half as wide or proportionately much smaller, firm-membranous, not bullate, harshly asperulous both sides, often obscurely pubescent or puberulent especially on the 8–17 prominent lateral nerves beneath; racemes axillary, erect to nutant, often 1–3 dm. long, pedicels 8 mm. long, calyx 3 mm. long, not costate, densely hirsute or tomentose, the 5 membranous oblong lobes 13–18 mm. long, about a third as wide, glabrous, the crest of 5 membranous ovate acute sparsely ciliate lobes about 1 mm. long and wide; corolla tube 6–8 mm. long, 4–5 mm. wide at apex, puberulent above and within where villous among the stamens, the largest lobe 5–6.5 mm. long; fruiting calyx to 4 mm. long, the rigid lobes to 22 mm. long, 7 mm. wide, the callose crest enclosing the mouth.—Has been confused particularly with *P. racemosa* Nees of Brazil (Moldenke) with appressed sericeous calyx. Cultivated at least at Lima and interesting in contrast to the native species; there is a forma *albiflora* Standley. Type from Veracruz, Mexico. Illustrated, Bot. Mag. 17: *pl. 628*.

Lima: Near Lima, *Soukup 2903*. Central America; Mexico; West Indies.

10. CITHAREXYLUM [Juss.] L.

Rauwolfia R. & P. Fl. Peruv. 2: 26, *pl. 152*. 1799, not L.

Reference: Moldenke, Phytologia 6: 242–256 (key), 262–320, 332–368, 383–432. 1958; l.c. 448–505. 1959; l.c. 7: 7–77. 1960.

Glabrous trees or shrubs, rarely scandent, or tomentose above with simple trichomes, now and then spinose in the axils, the leaves sometimes spinose-dentate, usually biglandular at base. Racemes or spikes axillary and terminal, elongate or short, the bracts of the few–many laxly borne flowers small. Calyx tubular-campanulate, truncately 5-dentate or shortly and broadly 5-lobed, cupulately accrescent or spreading beneath the fleshy drupe, this with 2 (1) usually 2-celled pyrenes (1-celled, *C. caudatum*). Corolla limb 5- (rarely 4- or 6-) parted, the lobes subequal. Stamens normally 4, didynamous, medial or higher, anthers ovate or sagittate, the cells parallel. Ovary perfectly or imperfectly 4-celled, the single ovules lateral. Stigma obscurely 2-cleft or lobate.—Besides the following, *Weberbauer 5916*, possibly from Piura or Ayacucho, has been listed under an unpublished name by Loesener (not seen by me); Moldenke, l.c. 256, lists a species *"peruvianum"* as a species of *Aloysia* from Ayacucho, not published (1958).

Moldenke has provided an artificial but useful key, and a supplementary one, prepared previously only for the Peruvian species, also was devised, obviously, expediently. So long as variation-range of characters accepted as indicative of specific values is unknown, no direct and simple key is possible; leaf-texture, dentation, and pubescence may prove to be less stable or significant when the shrubs are better known.

KEY TO CITHAREXYLUM (after Moldenke)

Spines present.

Branches, branchlets acutely angled, 4-margined; nodes strongly annulate.

Leaves densely punctate beneath, mostly serrate. . *C. Herrerae.*

Leaves not punctate, entire. . . . . *C. andinum.*

Branches, branchlets mostly obtusely angled, not margined; nodes usually obscurely annulate.

Petioles 1–3 mm. long; leaves to 1 cm. wide. . . *C. Weberbaueri.*

Petioles 3–15 mm. long; leaves mostly much wider. *C. megacanthum, C. flexuosum.*

Spines absent.

Leaves ternate.

Leaves sharply serrate, 2–3.5 cm. wide. . . . . *C. quercifolium.*

Leaves entire, mostly much wider. . . . . *C. Poeppigii.*

Leaves opposite or the younger approximate.

Leaves dentate, more or less coriaceous.
Racemes to 4 cm. long, mostly much less.
Leaves merely subcoriaceous.
Branchlets verruculose (densely lenticellate); leaves 7–12 mm. wide, drying dark.....*C. pachyphyllum.*
Branchlets smooth; leaves 8–40 mm. wide, not discoloring.....*C. ilicifolium.*
Leaves firm- or leathery-coriaceous.
Leaves rigidly heavy-coriaceous, often discolored when dried; racemes 1–3.5 cm. long.....*C. dentatum.*
Leaves firm-coriaceous, not discoloring; racemes 1–5-flowered.
Leaf surface deeply punctate, margins subentire. *C. punctatum.*
Leaf surface beneath epunctate, margins coarsely serrate.....*C. argutedentatum.*
Racemes 4–25 cm. long.
Leaves acute, not revolute.....*C. laurifolium.*
Leaves obtuse or emarginate, revolute.....*C. caudatum.*
Leaves entire.
Leaves glabrous unless puberulent-punctate or midrib pilosulous.
Racemes attenuated, few-flowered.
Both leaf surfaces deeply punctate.....*C. punctatum.*
Upper leaf surface epunctate.
Mature leaves discolored when dried, reticulation obscure above.....*C. pachyphyllum.*
Mature leaves usually not discoloring, reticulation obvious above.....*C. ilicifolium.*
Racemes elongate, many-flowered.
Leaves thin-membranous, fragile.....*C. chartaceum.*
Leaves chartaceous to coriaceous.
Racemes 1–4.5 cm. long; leaves rarely to 7 × 4 cm. long, petioles 2–5 mm. long.....*C. ilicifolium.*
Racemes and petioles mostly longer; leaves larger.
Vein reticulation prominent above...*C. reticulatum.*
Vein reticulation obscure or faint above.

Flowers sessile.....*C. laurifolium.*
Flowers distinctly pedicellate.
Nutlets 2-celled.....*C. suberosum.*
Nutlets 1-celled.....*C. caudatum.*
Leaves puberulent beneath.
Leaves ample, 7.5–12 cm. wide.....*C. Poeppigii.*
Leaves rarely 7 cm. wide.
Leaves chartaceous.....*C. Kobuskianum.*
Leaves thin-membranous.....*C. chartaceum.*

SUPPLEMENTARY KEY TO CITHAREXYLUM

Leaves (at least many of them) 5–10 cm. long or longer.
Nutlets 1-celled; slender glabrous shrub-tree except tomentose corolla, this 5–8 mm. long, tube to twice as long as 3 mm. long subtruncate calyx; racemes often 1 dm. long or longer, pedicels 2 mm. long.....*C. caudatum.*
Nutlets 2-celled; characters in part not as above.
Calyx early subtruncate, 5-denticulate; leaves entire or mostly except *C. quercifolium.*
Leaves membranous; basal glands none or minute.
C. chartaceum.
Leaves coriaceous; basal glands 2, large.....*C. Poeppigii.*
Leaves coriaceous or subcoriaceous.
Basal glands none (always?).
C. quercifolium, C. reticulatum.
Basal or sub-basal glands several.....*C. suberosum.*
Calyx non-lobed; leaves in part or obscurely serrulate; glands none.....*C. laurifolium.*
Leaves at most about 5 cm. long, mostly or all smaller.
Branches (ex. char.) espinose.
Leaves coarsely dentate below the middle...*C. argutedentatum.*
Leaves at least in part subentire or more or less dentate above the middle.
Racemes short; leaves coriaceous or subcoriaceous.
Leaves compactly punctate both sides.....*C. punctatum.*
Leaves obscurely or not conspicuously nor closely punctate at least above.

Corolla lobes and throat pilose; leaves subcoriaceous. *C. ilicifolium.*

Corolla glabrous except throat.

Leaves rigid; calyx 5–7-dentate or -cleft..*C. dentatum.*

Leaves flexible; calyx 5-denticulate..*C. pachyphyllum.*

Racemes to 6.5 cm. long; leaves membranous. *C. Kobuskianum, C. megacanthum.*

Branches (ex char.) more or less spinose.

Racemes 2.5–6.5 cm. long; leaves obovate, rounded at apex. *C. Kobuskianum, C. megacanthum.*

Racemes short, 2–several-flowered; leaves obscurely or not obovate.

Branches, branchlets subalately quadrate, glabrous. *C. Herrerae.*

Branches subterete, branchlets early acutely quadrate, puberulent.

Calyx teeth in types 5.....*C. andinum, C. flexuosum.*

Calyx teeth in type 4 but obscure.....*C. Weberbaueri.*

Citharexylum andinum Mold. Repert. Sp. Nov. 37: 217. 1934; 288.

Branches, branchlets and slender shoots glabrous, lustrous, spinose, acutely tetragonal, the younger often 4-marginate; nodes strongly annulate; spines slender, 6–16 mm. long, with 3 sterigma-like subapical scars; leaf-scars very corky, suberose; petioles slender, 3–6 mm. long; leaves oblong or elliptic, acute at base, rounded or subemarginate at apex, about 1– nearly 3 cm. long, 5–13 mm. wide, entire, subchartaceous, glabrate, not glanduliferous, the 4–5 arcuate lateral nerves scarcely impressed above nor prominent beneath; racemes 2–4-flowered, to 1 cm. long; peduncles 1–4 mm. long; pedicels 1–3 mm. long, puberulent or glabrate as the calyx, this 3.3 mm. long, distinctly 5-costate, minutely 5-apiculate; corolla tube 3.6 mm. long, tomentose only within at throat, the oblongish lobes rounded apically, 2 mm. long; stigma sub-bilobed; calyx in fruit cupulate, to 5 mm. wide, 3 mm. long; fruit subglobose, about 8 mm. thick, drying bisulcate. —Closely related to *C. Weberbaueri* Hayek and *C. flexuosum* (R. & P.) D. Don, but differs from both in the acutely angled branchlets and glabrate leaves. Has been confused, also, with *Duranta Plumieri* Jacq. but the twigs are not covered with approximate sterigmata (author); from range, the Scolnik specimen would be more usually

referable to the typically northern shrub of Ruiz and Pavón. F.M. Neg. 28393.

Cajamarca: *Scolnik 1302* (det. Moldenke). Bolivia.

Citharexylum argutedentatum Mold. Repert. Sp. Nov. 37: 218. 1934; 289.

Shrub, glabrous except the obscurely furfuraceous puberulent branches and branchlets, these slender, strongly sarmentose; decurrent lines (sterigmata) incrassate, 1–2 mm. long; nodes indistinctly annulate; petioles 1–2 mm. long; leaves opposite, rotund-elliptic, abruptly attenuate at base and shortly prolonged into petioles, 12–19 mm. long, 9–18 mm. wide, below the middle coarsely dentate (teeth divergent, often recurved), coriaceous, lustrous both sides, glandular-punctate beneath, the midnerve there prominent, secondary veins 3 or 4, reticulation obscure; racemes only 1–3-flowered, when 1-flowered appearing axillary in upper leaves; fruiting calyx 3–4 mm. long and thick, 4- or 5-dentate or -lobate; fruit subglobose or oblong, 3–4 mm. long, lustrous, drying black and apiculate at apex. —Related to *C. ilicifolium* HBK. and to *C. pachyphyllum* Mold. in its very thick-coriaceous, waxy-nitid holly-like leaves; the greatly reduced inflorescences are remarkable (author).

Cuzco: Ollantaitambo, (*Cook & Gilbert 719; 745*, type).—Puno: Río Limbani, *Goodspeed Exped. 30464;* (*Metcalf 30464*). "Tasta" or "tosta."

Citharexylum caudatum L. Sp. Pl. ed. 2: 872. 1763; 299.

Glabrous with terete striate branches, the leaves laterally glandular at attenuate base, and terminal or axillary erect racemes of fragrant flowers; leaves elliptic or oblong, subacute, obtuse or emarginate, a dm. long or longer, about half as wide, coriaceous to membranous, lustrous above, subrevolute; calyx 3–4.5 mm. long, subtruncate, obtusely 5-dentate, the apically puberulent corolla-tube about twice as long; fruit lustrous, tardily black, 6–12 mm. long, 5–10 mm. wide.—Notable in the 1-celled nutlets (not noted by Moldenke, l.c. 251); the pedicels in flower are usually 2 (–2.5) mm. long, leaves prominently and openly reticulate-veined. Cultivated in Chile, Cuba, and Peru (*Raimondi 11906*, fide Moldenke). Moldenke notes, with reason, that the Peruvian collections must have been cultivated or persisting in abandoned areas, which explains Raimondi's observation (quoted by Moldenke, 305), "indigenous at Chanchamayo."

Junín: Pampa hermosa, Montana de Pangao, (*Raimondi 12507*, det. Moldenke). Chanchamayo, (*Raimondi 12203*). Mexico; West Indies.

Citharexylum chartaceum Mold. Repert. Sp. Nov. 37: 219. 1934; 310.

Glabrous or glabrescent, only a light puberulence on leaves beneath and peduncles, these 1.5–3 cm. long; branchlets and shoots acutely tetragonous and marginate; nodes obscurely or not annulate; corky elevations (sterigmata) at tip of branches thick, suberose, to 4 mm. long or wide; petioles opposite, slender, 2–13 mm. long; leaves oblong-elliptic, broadly elliptic or subobovate, 5–15.5 cm. long, 3.2–7.2 cm. wide, acute or acuminate to base where sometimes 1 or 2 minute glands, acute or shortly acuminate, thin-chartaceous; midnerve slender, secondary veins 5–8, the reticulation fine; racemes terminal or on axillary branchlets, mostly nutant, 9–18 cm. long; bractlets often 2, linear, to 4 mm. long; pedicels obsolete or to 1 mm. long; calyx translucent, about 3.1 mm. long, 2.8 mm. across, minutely 5-denticulate; corolla tube 4.4 mm. long, densely long pilose within at throat; lobes oblong-obovate, 3.2 mm. long, 2.3 mm. wide, pubescent within; stamens set 2 mm. below throat; style 1.5 mm. long, stigma minutely bilobate.—Related to *C. quitense* Spreng. and referred in herbaria to *C. molle* HBK.; the thin leaves with delicate but conspicuous and yet not at all elevated venation on the lower surface, and the lanate corolla-throat, characterize it well (author). Tree or shrub 5–8 meters tall, in deciduous brushwood.

Tumbez: East of Hacienda Chicama, 1,000 meters, *Weberbauer 7633*, type; *7678*. Ecuador.

Citharexylum dentatum [Tafalla] D. Don, Edinb. New Phil. Journ. 11: 237. 1831; 320, 332 (descriptions).

Much branched, unarmed, known to attain 5 meters, the more or less acutely quadrate branchlets and short terminal racemes puberlent; nodes rather obscurely annulate; leaf-scars large, borne on stout corky sterigmata 1–2.5 mm. long; petioles thick, 1–10 mm. long; leaves crowded, obovate-oblong or elliptic, attenuate to base, obtusely rounded or acute at apex, about 2.5 (–3) cm. long, 7–19 mm. wide, entire or acutely or spinose dentate, rigid coriaceous, revolute, punctate and somewhat scabrous both sides but not glanduliferous, lustrous above, paler and opaque beneath; nerves 4–6 pairs, obscure above, rather conspicuous as sometimes veins beneath; racemes 1–

3.5 cm. long, few- to many-flowered, pedicels obsolete or to 4.5 mm. long in fruit, indurate as fruiting calyx; bracts setaceous or linear, to 3 mm. long; calyx 5–7-nerved, acutely 5–7 dentate or cleft, nearly 4 mm. long, in fruit to 5 mm. long, 8 mm. wide; corolla glabrous except for the villous throat, the tube exserted; fruits about 1 cm. in diameter, lustrous, black even when fresh (Moldenke).—Apparently is the correct name for at least the individuals cited under *C. ilicifolium* HBK. and *C. pachyphyllum* Mold. A 5-meter tree, the berries said to be used for making ink (Stork & Horton). Type by Ruiz and Pavón, perhaps from near Tarma, the name by Tafalla in part of the expedition's collections but as a species of *Rauwolfia*. F.M. Neg. 17592.

Junín(?): *Ruiz & Pavón*, type.—Huancavelica: Salcabamba, 3,500 meters, *Stork & Horton 10336* (det. Standley).—Ayacucho: Above Quinua, 3,400 meters, *Weberbauer 5537*.

Citharexylum flexuosum (R. & P.) D. Don, Edinb. New Phil. Journ. 11: 237. 1831; 349. *Rauwolfia flexuosa* R. & P. Fl. Peruv. 2: 26, *pl. 152, fig. a*. 1799. *R. macrophylla* R. & P. l.c. *fig. b*. *C. retusum* D. Don, l.c. *C. spinosum* HBK. Nov. Gen. & Sp. 2: 256. 1818; 610. *Scypharia tetragona* Miers, Contrib. 1: 302. 1851–1861, fide Weberbauer, Field Mus. Bot. 8: 84. 1930.

Branches obtusely or sometimes acutely tetragonal, the short stout branchlets modified into spines to 5 cm. long, the flexuose younger also spinescent and as the leaves beneath more or less pubescent; leaf-scars on corky sterigmata 1.5–3.5 mm. long; leaves oblong or subelliptic, sometimes obovate, attenuate to slender petioles (3–15 mm. long), obtuse to emarginate, mucronulate, entire, (2) 3–5 (6) cm. long, (1) 1.5–2.5 (3) cm. wide, membranous, finely reticulate-veined, nerves slender, 5–7 pairs, finally lustrous and glabrate above, subtomentose to glabrate beneath; racemes terminal on axillary branchlets, few-flowered, laxly short-pubescent; pedicels filiform, 1 mm. long; calyx campanulate, nearly 4 mm. long, membranous, 5-nerved, obtusely 5-dentate, subequaling the broad tube of the corolla, this with rounded ciliate lobes pilose as the corolla throat; anthers sagittate; calyx in fruit 2.5–3 mm. long, 4–6.5 mm. wide, early subtruncate rim finally splitting into rounded lobes; fruit purplish-black or black, about 8 mm. long and wide, glabrate.—Often becoming completely or essentially glabrous except the puberulent calyx and white or paler corolla within. The var. *subglabrum* Mold., Repert. Sp. Nov. 37: 222. 1934, apparently described the mature

leaves of a form which proved to be *Lycium subglabrum* Mold. (author). The greenish-cream flowers are delightfully fragrant in the morning and the branches are used for small crosses, the spines serving as arms (Ruiz & Pavón). F.M. Negs. 29685; 17601 (*C. spinosum*).

Cajamarca: Yanaguanga, *Bonpland* (type, *C. spinosum*).—Ancash: (*Raimondi*).—Lima: Río Blanco, *Killip & Smith 21679*. Matucana, *464*. San Rafael, *2409*.—Huánuco: Near Huánuco, *3523; Ruiz & Pavón*, type. Llata, *2279*. Ambo, *3173; 2438*.—Arequipa: Mollendo, 600 meters, (*Guenther & Buchtien 129; 130*, det. Bruns, glabrate form). Atiquipa, *Tafalla* (type, *R. macrophylla*). Rock slides near Chala, *Worth & Morrison 15700*. "Turucasa," i.e. spina obtusa (Ruiz & Pavón); "chama" (Tafalla), "choloquillo simarron."

Citharexylum Herrerae Mansf. Notizbl. Bot. Gart. Berlin 9: 469. 1925; 401.

Branchlets distinctly and acutely quadrate or even quadrialate, spiny, green, early somewhat puberulent as the young leaves; spines tetragonal, often branching; sterigmata to 3 mm. long; leaves oblong-elliptic-lanceolate, decurrent into the 1–4 mm. long petiole, rounded to acute, mucronulate, 1–2.5 cm. long, 3–9 mm. wide, entire or serrate below the middle, chartaceous, soon quite glabrous, plane above, punctate beneath, the 4–6 nerves scarcely impressed; racemes axillary, to 2.5 cm. long, 4 cm. in fruit; pedicels in fruit to 1 mm. long; calyx 3.5 mm. long, shortly 5-dentate, in fruit to 6 mm. broad, subentire or lobate, glabrous; corolla 5 mm. long, lobes 1 mm. long, these within and throat pilose; filaments inserted medially; style 2 mm. long, the stigma sub-bilobed; fruit oblong-globose, 8 mm. thick, to 11 mm. long, lustrous, red when fresh.—Distinguished from other spinescent species by the glabrous leaves, subalate and green branchlets; also, axillary shoots are frequent and persistent; they even puncture flowers and fruits (author); the uppermost branches are modified into spike-like thorns (Moldenke).

Cultivated; the beautiful red fruiting branches used for ornamentation of the *nacimientos* (Herrera). Tree, 3–5 meters tall (Pennell). F.M. Neg. 17595.

Apurímac: (*Vargas 8753; 9137*, both det. Moldenke). Saxaihuamán, *Herrera 677*, type.—Cuzco: Cuzco Valley, 3,200 meters, *Herrera 1464a; Soukup 322*; (*Cook & Gilbert 1888; Ferreyra 9856*, det. Moldenke). San Sebastian, *Pennell 13606*. "Huariruru."

Citharexylum ilicifolium HBK. Nov. Gen. & Sp. 2: 256. 1818; 411.

Similar to *C. dentatum;* leaves elliptic-oblong, obtuse, 2–7 cm. long, 1–4 cm. wide, entire or spinose-dentate, glabrous and finally lustrous above and subcoriaceous, punctate and early pubescent beneath; nerves 7–10 pairs, reticulation rather prominent both sides; calyx 5-nerved, minutely 5-dentate, pubescent as pedicels; corolla tube little exserted, white, the lobes and throat pilose; fruiting calyx (Moldenke) cupuliform, about 3 mm. long, 6 mm. wide, puberulent or hirtellous, the 5 conspicuous lobes at least apiculate, often subserrate; fruit finally black or black-purple, 6 mm. long and wide.—Leaves in type about 3 cm. long, half as wide, the veins densely reticulate or prominent beneath, somewhat attenuate to base; on younger branchlets to 5.5 cm. long, often more or less repand-dentate. Perhaps not in Peru, at least in typical form, but Moldenke refers to it collections by Gay and by Dombey, without, however, known localities; the similar Peruvian shrub could prove to be a part, genetically considered; I have not seen the Weberbauer collection in the final preparation of this account. F.M. Neg. 17593.

Ancash: Yungay, *Weberbauer 3285* (det. Hayek). Ecuador to Bolivia. "Zitac" (Ecuador).

Citharexylum Kobuskianum Mold. Phytologia 1: 441. 1940; 424.

Younger branchlets, chartaceous leaves, especially beneath, and axillary racemiform inflorescences (these to 6.5 cm. long), including the herbaceous calyx more or less puberulent, the leaves above very sparsely; nodes enlarged; leaf-scars prominent, corky; petioles very slender, 2–5 mm. long; leaves entire, oblong-elliptic, acutely or shortly acuminate at base, acute and shortly apiculate at apex, 2.5–5 cm. long, 1.5–2.2 cm. wide, the 7–10 secondary nerves slender, obscure above; fruiting pedicels about 3 mm. long; fruit 5 mm. long, 4 mm. thick, glabrous, fleshy.—Named for C. E. Kobuski, whose monograph of the genus *Priva* is excellent (author); the collector's name is correctly written Jelsky (Moldenke); in lit. (and on the labels), however, as here.

Cajamarca: Chota, (*Jelski*, type; *Raimondi 6303*).—La Libertad: (*López Miranda 648*, det. Moldenke).

Citharexylum laurifolium Hayek, Bot. Jahrb. 42: 170. 1908; 449.

Quite glabrous lustrous shrub, the somewhat tetragonal branches unarmed, subangled, the lanceolate eglandular (type) leaves narrowed to base, acute, 5–13 cm. long, 3–5.5 cm. wide, entire or mucronulate-serrate above, coriaceous, lustrous both sides, nerves slender, 4–6, veins finely reticulate; racemes terminal, erect, very strict, several cm. to 2 dm. long or longer, the rachis stout, the many often loosely borne flowers subsessile; calyx in fruit irregularly lobed or bilobed, incrassate, to 6 mm. long, 7 mm. wide; fruit ovoid, about 8 mm. long, 5 mm. wide, black in drying.—Corollas lacking in type which resembles *C. caudatum* L. but leaves not revolute, rachis exceptionally thick and calyx 2-lobed (author); it may be conspecific with *C. reticulatum* HBK. (Moldenke) to which in manuscript I had referred it; it may, however, as so often with northern species, be a southern development. Type a shrub about 1 meter tall, the flowers greenish (Weberbauer). F.M. Neg. 17594.

Puno: Sandía to Cuyocuyo, 2,500 meters, *Weberbauer 873*, type. Bolivia.

Citharexylum megacanthum Rusby, Bull. N. Y. Bot. Gard. 8: 115. 1912.

Glabrate, the branches and spines stout, the former sulcate, the latter divaricate, straight, pungent; petioles 3–5 mm. long; leaves obovate, abruptly contracted at base, rounded at apex, 1.2–2.5 cm. long, 8–16 mm. wide, revolute, bullate above, the 4–5 pairs of nerves prominent beneath; racemes axillary, 2.5–5 cm. long in fruit, the short stout pedicels recurving; calyx 6 mm. broad in fruit, the lobes unequal; fruit subglobose, deep purple, 6–7 mm. in diameter.—A bush, 3 meters tall. This was originally included as a synonym of *C. flexuosum* (R. & P.) D. Don.

Arequipa: Mollendo, (*R. L. Williams 2544*, type).

Citharexylum pachyphyllum Mold. Repert. Sp. Nov. 37: 232. 1934; 491.

Rather stoutly branched densely leafy essentially glabrous shrub, the obtusely tetragonous branches and branchlets early obscurely puberulent or glabrate, often verruculose, the nodes (1–3 cm. distant) faintly annulate; sterigmata only 1–2 mm. long; petioles 2–3 mm. long; leaves oblong or elliptic, often broadly, in type, or subrotund, subacute and eglandular at base, rounded but mucronate at tip, 1.5–2.5 cm. long, 7–15 mm. wide, coriaceous, subentire or remotely and minutely denticulate (2–3 repand-denticulate each edge in type),

coriaceous, densely punctate beneath, glands lacking, lustrous both sides, nerves 3–5 pairs, the veins obscure; racemes 1–1.5 cm. long; pedicels to 1 mm. long; bracts none; calyx obconic, minutely 5-dentate, to 4 mm. long, 7 mm. wide, and in fruit unevenly lobed; corolla tube 4.3 mm. long, tomentose within at throat, the 4–5 rounded lobes 1–3 mm. below the throat, subsessile; style stout, stigma lobes indistinct; ovary imperfectly 4-celled.—Description of flowers apparently taken by Moldenke from the more oblong-leaved Ayacucho specimen. Leaves of Metcalf specimens suborbicular, scarcely 1 cm. long; fruit to 11 mm. long, 13 mm. wide, deep purple, very firm. Related to *C. ilicifolium* HBK., *C. dentatum* D. Don, *C. punctatum* Greenm. (author), the type a shrub to 2 meters tall. I had referred my collection (the type) to the shrub of HBK., that perhaps, at least typically, only in Ecuador; it is the earliest name among these similar shrubs, if they are not specifically distinct; the Metcalf specimen is toward *C. punctatum.* Both *Asplund 11496* and *Mathews 1021* were referred here by Moldenke but localities were not given by him.

Junín: Shrubby canyon, about 3,000 meters, Huariaca, *3090,* type.—Ayacucho: Below Tambo, *Weberbauer 5565.*—Puno: South of Limbani, *Metcalf 30464* (det. Moldenke).

Citharexylum Poeppigii Walp. Repert. 4: 76. 1845; 498.

Subterete branches and branchlets as the rachis of the axillary and terminal racemes or panicle lanuginose or glabrate; leaves opposite or ternate, entire, subovate-oblong, abruptly decurrent into 3–4 cm. long petiole, normally acuminate, about 2 dm. long, chartaceous or subcoriaceous, subnitidulous above, opaque and especially on nerves lanate beneath; nerves 9–14 pairs, reticulation dense; racemes to 1.5 dm. long; flowers sessile or subsessile, fragrant, to 18 mm. long, glabrous; calyx obconic, 3 mm. long, not nerved, obtusely dentate, membranous, finally puberulent; corolla tube 6 mm. long, throat lanate; drupes ovoid-oblong.—Conspicuously marked by the pair of large glands at the base of leaves. The var. *margaritaceum* Poepp. ex Mold., Repert. Sp. Nov. 37: 233. 1934, has ovate-elliptic rarely oblong leaves 2–2.5 dm. long, 7.5– nearly 9 cm. wide, densely puberulent-lepidote beneath, secondary nerves 12–15, petioles to 2.5 cm. long, racemes to 4.5 dm. long, peduncles to 7 cm. long, corolla to 7 mm. long (Moldenke); authority of variety published, incorrectly, as Poeppig and Moldenke. Recorded as a tree to 18 meters tall. Similar species(?) to be expected as collected in adjacent

areas are *C. Ulei* Mold. l.c. 237 (Phytologia, 66) and *C. amazonicum* Mold. l.c. 216 (Phytologia, 286), the latter with petioles 5–6.5 cm. long, leaves membranous-chartaceous, the former with mature flowers nearly 12 mm. long, this with name "cauchillo," occurring to the base of the Andes in Colombia (Schultes). Type from Río Acre, Brazil, so of course also within Peru in one form or another. F.M. Neg. 7876 (var.).

Loreto: Río Mazán, *José Schunke 365*. Río Paranapura, *Klug 3943* (var.). Yurimaguas, *Poeppig 2219* (type, var.); *Williams 7183; Tessmann 3491*. Iquitos, *Williams 8030*. Río Nanay, *Williams 261; 413*. Brazil to Colombia. "Mullahuayo," "quiniellia blanco" (Williams).

Citharexylum punctatum Greenm. Field Mus. Bot. 2: 189. 1907; 504.

Branches terete, the ultimate branchlets subtetragonal, cinereous puberulent as the short (to 1.5 cm. long) racemes; leaves elliptic-oblong to subobovate, narrowed to short petiole, usually shortly acuminate or somewhat pungent, 1–2.5 cm. long, 5–12 mm. wide, entire or rarely with 1 or 2 teeth, lustrous, subcoriaceous, glabrous but conspicuously punctate above, minutely so beneath; nerves 3–4 pairs, as the reticulation visible only beneath; calyx tubular-campanulate, 3–4 mm. long, 5-angled, ciliolate, sinuately 5-dentate, in fruit deeply and acutely 5-lobed, 4 mm. long, wide (Moldenke); corolla 5–6 mm. long, pubescent only within above and in throat, the lobes oblong, about 2 mm. long; drupe 10–12 mm. long, fleshy, lustrous, black or purplish when dry.—Distributed as *C. ilicifolium* HBK.; differs in smaller entirely glabrous leaves, not spinose-dentate; the striking impressed punctation is diagnostic (author); a gnarled shrub, to 2 meters tall, of high (3,300–3,800 meters) altitudes.

Puno: Cuyocuyo, Prov. Sandía, *Weberbauer 935* (det. Moldenke, det. Hayek, *C. ilicifolium*). Bolivia.

Citharexylum quercifolium Hayek, Bot. Jahrb. 42: 169. 1908; 7.

Scandent with smooth subterete branches and remotely spinose dentate leaves, these ternate (type), oblong-elliptic, narrowed to petiole, obtuse or short-acuminate, (3) 5–8 cm. long, 2–3.5 cm. wide, entire toward base, more or less coriaceous, glabrous, sublustrous above, opaque beneath, finely reticulate-veined; racemes erect, 2.5–0.5 cm. long, subsecund, rachis slightly puberulent; calyx campanu-

late, 5-denticulate; corolla fragrant, white, 8 mm. long, exserted.—Outstanding in the large coriaceous spiny serrate leaves (author); seems probably an extreme variant of *C. reticulatum* HBK. F.M. Neg. 17598.

Cajamarca: Toward Celendin, 3,100 meters, *Weberbauer 4248*, type.

Citharexylum reticulatum HBK. Nov. Gen. & Sp. 2: 257. 1817; 13.

Branches (younger) tetragonal, glabrous, striate; leaves decussate-opposite, obovate-elliptic or oblong, attenuate to short petiole, obtuse, subacuminate or retuse, entire (rarely dentate-spinose), 5 cm. long or longer, 16–24 mm. wide, coriaceous, strongly reticulate-veined beneath, lustrous above, puberulent only early on nerves beneath; racemes terminal, to 4 cm. long, erect, hirtellous; calyx minutely repand-dentate, 5-nerved; corolla white, exserted, puberulent, tomentose villous in throat (Peru?); drupe globose, black.—Type from Río Catamayo, southern Ecuador. F.M. Neg. 39479.

Junín: Comas, *Weberbauer 6604* (det. Moldenke, *C. laurifolium*). —Lima: (*Ferreyra 10426*, fide Moldenke). To Colombia.

Citharexylum suberosum Loes. ex Moldenke, Phytologia 7: 49. 1959.

Resembles in general *C. reticulatum* (pedicels 1–2 mm. long or obsolete) but branches and branchlets acutely quadrate, petioles to 12 mm. long, leaves to 13 cm. long, half as wide (often smaller), frequently with a few scattered glands at or near base beneath, the vein reticulation rather obvious on both surfaces; racemes 7.5–20 cm. long, rachis slender, glabrous; calyx in fruit indurated, 5.5 mm. long, 7 mm. across, unevenly and deeply lobed; fruit about 7 × 6 mm., lustrous.

Apurímac: locality unknown, *Weberbauer 5916*, type.

Citharexylum Weberbaueri Hayek, Bot. Jahrb. 42: 169. 1908.

Branches short, the spines simple or much branched; leaves entire, obovate, obtuse, narrowed to short petiole, scarcely 2 cm. long, plane, early pilose above, glaucescent, densely velutinous beneath, this indument partly deciduous; racemes only 3–5-flowered, the rachis and peduncles velvety puberulent; calyx campanulate, subtruncate, 4-denticulate, rather velvety puberulent, little exceeded by the yellowish corolla, this puberulent within.—A meter tall, resembling *C. flexuosum* but the leaves not rounded, the racemes few-flowered, the

blossoms small (author); this as *C. andinum* Mold. may be genetically distinct but the problem is certainly open to question. F.M. Neg. 17603.

Huánuco: Open mixed formation, 2,750 meters, near Chuquibamba, Prov. Huamalies, *Weberbauer 3731*, type.

11. DURANTA L.

Reference: Schauer in DC. Prodr. 11: 615–616. 1847.

Resembles *Citharexylum* but, especially, the drupe is nearly or quite included and consists of four 2-celled 2-seeded pyrenes. Leaves sometimes verticillate.—The species as proposed seem to be tenuous; all the characters used expediently in the following key appear to be variable, a conclusion reached by the often discerning Otto Kuntze, Rev. Gen. 2: 507. 1891. However, Moldenke, without offering a solution, has revived the question, which obviously will be answered only by information other than morphological. At this date (February, 1959), unfortunately, he has not published a revision, so the following account does not benefit by the detailed contributions he has made in the case of several other genera.

Calyx, as usually the young leaves beneath, somewhat pubescent.
Corolla tube well-exserted, 1–1.5 cm. long.
Calyx obscurely apiculate, open in fruit, not beaked.
D. Dombeyana.
Calyx teeth in some degree forming a contorted beak in fruit.
Leaves pubescent beneath unless in age.
Calyx teeth after anthesis coiled; leaves typically subacute.
D. Sprucei.
Calyx shortly beaked after anthesis; leaves rounded.
D. triacantha.
Leaves soon glabrous and lustrous; calyx beak short.
D. Skottsbergiana, D. Mutisii.
Corolla tube to about 8 mm. long, little exserted; calyx beak short.
D. peruviana.
Calyx, as leaves, glabrous or glabrate (cf. *D. Sprucei*, rarely).
Leaves more or less coriaceous and nerves impressed above or obscure.
Calyx about 2 mm. thick, subcampanulate in *D. armata.*
Leaf nerves well-impressed.
D. lineata, D. obtusifolia, D. Mutisii.

Leaf nerves subimpressed.
Leaves subacute, at least the larger.
Calyx subcampanulate, apiculate.....*D. armata.*
Calyx tubular, denticulate.....*D. coriacea.*
Leaves all rounded at apex, mucronulate.....*D. rupestris.*
Calyx about 3.5–4 mm. thick, more or less campanulate.
Calyx glabrate; corolla tube scarcely exserted..*D. Mandoni.*
Calyx somewhat canescent; corolla tube well-exserted.
D. Skottsbergiana, D. Mutisii.
Leaves firm-membranous, the nerves rather raised above.
D. repens.

Duranta armata Mold. Bull. Torrey Club 68: 499. 1941.

Rigid notably spiny branches and branchlets early, as the young leaves and 1–few-flowered inflorescences, more or less appressed puberulent including the calyces without; spines slender to stout, rigid, rarely opposite or ternate, 1–3 cm. long or longer; petioles obsolete to 3 mm. long; leaves fasciculate, oblanceolate or elliptic, about 0.5–3 cm. long, 4–14 mm. wide, the larger acute, the small obtuse, rounded or often subemarginate, entire or 2–4-dentate above, acute or attenuate at base, glabrous in age, lustrous above, punctate beneath; secondary nerves 2–5; peduncles acutely tetragonal, 2–18 mm. long; pedicels 1 mm. long, to 4 mm. in fruit; bractlets 1–4 mm. long; calyx campanulate, 3–3.5 mm. long, 5-costate, truncately 5-apiculate; corolla tube broadly cylindrical, 7 mm. long, glabrous except at tip, the 5-parted limb 7–10 mm. across, densely puberulent both sides; fruiting calyx papery, the rim usually persistently puberulent-pilose; fruit tetragonal, 4 mm. long and wide, distinctly 4-lobed and sulcate in drying, glabrous, lustrous.—Flowers violet-purple to nearly white, the fruit red (Stork & Horton).

Junín: (Moldenke).—Huancavelica: Mejorada, *Stork & Horton 10896.*—Ayacucho: Near Ayacucho, *Weberbauer 5499; West 3643; 3644.*—Apurímac: Pincos, *Stork & Horton 10685.*—Cuzco: Yucay, *Soukup 738; 739; Herrera 1127.* Near Cuzco, (*Herrera 85*, type, Berlin-Dahlem). "Upa blanca" (Herrera), "tancar" (Stork & Horton).

Duranta coriacea Hayek, Repert. Nov. Sp. 2: 88. 1906.

Branches subterete, glabrous as the opposite entire little revolute leaves, these short-attenuate into petiole, elliptic, acute, coriaceous,

concolor, plane, lustrous above, opaque beneath; calyx tube about 5 mm. long, shortly but subulately 5-dentate, slightly tomentulose marginally; corolla tube 12 mm. long, nearly straight, limb plane, finely tomentulose; drupe fleshy, 8 mm. in diameter.—After author, who remarked: differs from *D. Plumieri* Jacq. (i.e. *D. repens* L.) in the lustrous corolla, always entire leaves, and from *D. Mutisii* L. f. in the smooth plane leaves. F.M. Neg. 17569.

Cajamarca: Ninabamba, *Weberbauer 4111*. Ecuador; Colombia.

Duranta Dombeyana Mold. Bull. Torrey Club 68: 500. 1941.

Strict shrub 2–4 meters tall, the obtusely angled branchlets, leaves beneath, and inflorescences tomentose; spines axillary, opposite, 5–7 mm. long; petioles slender, margined above, 4–8 mm. long; leaves decussate-opposite, often with an additional pair or fascicle on short axillary branchlet; leaf-scars corky, semicircular; leaves rounded to acuminate both ends, about 2–9 cm. long, 1–4 cm. wide, chartaceous, lightly short-pubescent or puberulent above, glabrate in age, rarely irregularly serrate, the nerves 4–6; peduncles 4–13 mm. long; axillary inflorescences 3–7 cm. long, the terminal to 2 dm. long, the flowers secund; pedicels obsolete, to 2.5 mm. long; calyx campanulate, 3–4 mm. long, 5-costate, flavescent-tomentose, the truncate rim obscurely 5-apiculate; corolla tube 13–14 mm. long, puberulent above, limb 8–11 mm. across, puberulent both surfaces; fruiting calyx obvolute, rostrate, completely enclosing the subglobose glabrous lustrous umbonate-rostrate fruit, this to 1 cm. long and wide.—If calyx character is variable it may be *D. Sprucei* Briq. My collection from a strict 3-meter tree of river bank, the flowers greenish-yellow; the author followed my suggestion as to name but made the type an Ecuador specimen; cf. the negative. F.M. Neg. 29682.

Piura: Quiros Valley, Prov. Ayavaca, *Weberbauer 6342*.—Huánuco: Yanano, *3798*.—Junín: Huassahuassi, *Ruiz & Pavón; Dombey*. Ecuador. "Sanacassa," "tantarprieto" (Ruiz & Pavón).

Duranta lineata Hayek, Bot. Jahrb. 42: 170. 1908.

Branches quadrate, spiny, glabrous as the entire coriaceous elliptic or oblong leaves, these narrowed to the short petiole, obtuse or mucronate, about 2 cm. long, lustrous and impressed lineate-nervose above, opaque and not strongly nervose beneath; racemes terminal or lateral, short, the rachis 4-angled, the nutant flowers shortly pedicellate; calyx lightly puberulent, about 8 mm. long, denticulate; corolla pale lilac, puberulent without, the tube about 12 mm. long.—

Belongs to the group of *D. triacantha* Juss. but with larger leaves, the nerves impressed and much larger flowers; *D. Benthami* Briq. has larger broadly rounded leaves, and many much longer racemes (author); may be a local condition due to environment. Type 3 meters tall, frequent in a small ravine (Weberbauer). F.M. Neg. 17570.

Ancash: Yungay, 3,300 meters, (*Weberbauer 3286*, type).

Duranta Mandoni Mold. Lilloa 5: 390. 1940.

Branchlets acutely 4-angled, early appressed puberulent as the peduncle and rachis; petioles 1–3 mm. long, canaliculate, sparsely appressed strigillose; leaves ternate or opposite, often crowded especially on short twigs, oblong-elliptic, cuneate at base, rounded or subemarginate, 7–23 mm. long, 5–12 mm. wide, entire but strongly revolute, subcoriaceous, glabrous above, densely punctate beneath; venation obscure or the secondaries apparent beneath; racemes axillary, 2–5 mm. long, the flowers secund; calyx about 7 mm. long, 3–4.5 mm. across, lightly puberulent; corolla tube 1 cm. long, glabrate, the limb and lobes puberulent.—Tree, 3–4 meters tall, corolla light purple, fruit yellow (Metcalf), about 12 mm. in diameter.

Ancash: (Moldenke).—Cuzco: Abancay, *Vargas & Santander 512* (det. Standley, *D. Sprucei*). Urubamba, *Soukup 61*. Marcapata, 3,000 meters, *Metcalf 30723*. Ecuador; Bolivia.

Duranta Mutisii L. f. Suppl. Pl. 291. 1781; 616. *D. Plumieri* Jacq. var. *strigillosa* Schauer in Mart. Fl. Bras. 9: 271. 1851?

Branches subangled, unarmed or spiny; leaves opposite or ternate, ovate or oblong-elliptic, narrowed to short petiole, acuminate, acute or obtuse, 4–10 cm. long, 2–5 cm. wide, entire or coarsely serrate from middle, coriaceous, glabrous or reticulate-veined, rugose, very lustrous above, opaque beneath; racemes axillary and terminal, many-flowered, about a dm. long, laxly pubescent, the violet flowers nutant; pedicels to 2 mm. long; calyx truncate, subulate-mucronate, the pubescent tube 6–8 mm. long; corolla 9–12 mm. long, the limb puberulent.—Spikes sometimes paniculate. Fruit orange when ripe (West), about 7–10 mm. thick; the variety may not belong here; cf. *D. repens* L.

Cajamarca: Hualgayoc, *Stork & Horton 10020*.—La Libertad: Angasmarca Valley, 3,300 meters, *West 8165*.—Junín: Huassahuassi, *Ruiz & Pavón* (type, var.).—Apurímac: Pachachaca Valley, 2,000

meters, *West 3793*.—Cuzco: (*Moldenke*). Colombia. "Cantar" (Ruiz & Pavón).

Duranta obtusifolia HBK. Nov. Gen. & Sp. 2: 254. 1818; 616.

Type unarmed, glabrous except the linear bracts, puberulent campanulate-tubular 5-dentate calyx and the twice as long violet corolla; leaves opposite, ovate, obtuse, decurrent into petiole 8 mm. long, coriaceous, reticulate-veined, about 2 cm. long, half as wide; spikes axillary and terminal; flowers remote, pedicels pendent, scarcely 2 mm. long; corolla tube two times longer than calyx; drupe globose-ovoid, enclosed in the calyx.—After author; referred by Schauer to *D. Mutisii* L. f.

Cajamarca: Near Jaën, *Bonpland*, type.

Duranta peruviana Mold. Bull. Torrey Club 68: 501. 1941.

Branches and branchlets decurrently flattened at the often shortly spiny nodes, the younger densely short pubescent; petioles 4–10 mm. long, ashy pubescent; leaves opposite, elliptic, acute or shortly acuminate, about 1.5–7 cm. long, 1–4.5 cm. wide, entire or serrate, chartaceous, closely puberulent above, sordidly velvet beneath; secondary nerves 6–9; inflorescence axillary and terminal, racemiform or paniculate, 7–14 cm. long; peduncles to 2.5 cm. long, canescently short pubescent as pedicels, these to 3 (–8) mm. long, tubular-campanulate calyx, this 3.5–4 mm. long, 5-costate, truncate, 5-apiculate; corolla tube 6–8 mm. long, densely puberulent above the calyx, the 5-parted limb to 1 cm. across, densely canescent-puberulent both surfaces.—Var. *longipedicellata* Mold., l.c. 502, pedicels after anthesis to 8 mm. long, flowers nutant, branchlets and leaves less pubescent. Fruit orange, showy (West).

Cuzco: Quillabamba, *Soukup 825*, type; *West 8001*. Valle Lares, *Diehl 2500*. Machu-Picchu, *Herrera 3209* (type, var.). "Mote-mote" (West).

Duranta repens L. Sp. Pl. 637. 1753. *D. Plumieri* Jacq. Select. Am. 186. 1763; 615.

Spiny or smooth, glabrous or glabrate densely leafy shrub often several meters tall, the slender tetragonal branches usually lax or trailing; leaves obovate or rather elliptic, cuneate basally, obtuse to acuminate apically, 1.5–5 cm. long, entire or serrate above; racemes also axillary, a few cm. to 1.5 dm. long, lax, often panicled; pedicels to 5 mm. long; calyx tubular, 3–4 mm. long; corolla blue or rarely a

purple tone, the tube exserted, the limb 7–9 mm. across; fruit yellow, 7–11 mm. in diameter, the calyx beak curved.—In cultivated areas (Ferreyra); very variable. Thus there is a var. *alba* (Masters) L. H. Bailey; a var. *microphylla* (Desf.) Mold. Phytologia 1: 483. 1941; a var. *canescens* Mold.; a var. *grandiflora* Mold.; and a var. *variegata* L. H. Bailey—all forms, their single emphasized character indicated by the name.

Piura: Near Sullana, *Ferreyra 6006*. Nearly all of warm America.

Duranta rupestris Hayek, Bot. Jahrb. 42: 71. 1908.

A procumbent spiny nearly glabrous shrub, the ternate spines 1–2 cm. long, the often verticillate leaves cuneate-obovate, obtuse or shortly 3-dentate apically, 1–2 cm. long, subcoriaceous, lustrous above, paler and opaque beneath, impressed glandular-punctate and the mid-nerve subpilose; racemes terminal, erect, dense, the rachis glabrous, the shortly pedicellate flowers nutant; calyx about 5 mm. long, 5-denticulate, villous in the throat, the violet corolla 8 mm. long, the spreading limb subpuberulent within.—Nearest *D. triacantha* Juss. but well-marked by the small often verticillate leaves, long racemes, small glabrous calyx (author). Used for fuel (Herrera). F.M. Neg. 17572.

Junín: Below Palca near Huacapistana, *Weberbauer 1759*, type; *Killip & Smith 24339; Ferreyra 3732*. Chanchamayo, *Isern 2421*.—Cuzco: Valle del Urubamba, *Herrera 1127*. "Ttancar."

Duranta Skottsbergiana Mold. Bull. Torrey Club 68: 502. 1941.

Branches mostly very spinose, glabrate, the younger branchlets shortly and densely pubescent as the petioles, the leaves early beneath and the racemiform or paniculate axillary and terminal inflorescence; spines rigid, a half to nearly 3.5 cm. long, opposite, ternate or scattered as the subcoriaceous lustrous leaves or these often borne in fascicles below the older spines, mostly elliptic or lanceolate to oblanceolate, obtuse or acute, often attenuate to margined petiole (2–11 mm. long), entire or sparsely sharp serrate toward apex, the younger slightly pilose above, the older glabrous and beneath impressed punctate; inflorescence 2–19 cm. long, flowers subsecund, bracts foliaceous, a pair at each inflorescence branch; bractlets to 7 mm. long; peduncles often 1–2 cm. long; calyx campanulate, 4–5 mm. long, truncate and 5-apiculate; corolla tube broadly cylindric, to about 1.5 cm. long, puberulent toward the 5-parted limb,

this 7–10 mm. across, canescent puberulent both surfaces; fruiting calyx coriaceous, glabrate, the subglobose yellow fruit about 1 cm. in diameter.—A shrub or small tree with blue or lavender flowers, the branches lenticellate-verruculose; named for Carl Skottsberg, the contemporary director of the botanical garden at Göteberg, Sweden.

Huánuco: Mito, *1484*, type. Near Huánuco, *2080; Ferreyra 6675*. Panao, *Woytkowski 116*.—Junín: Uspachaca, *1304*.

Duranta Sprucei Briq. Bull. Herb. Boiss. 4: 344. 1896.

Branches ferrugineous-puberulent, divaricate-ascending; petioles 1 cm. long; leaves elliptic or ovate-elliptic, abruptly subacute at base, obtuse at apex, 6–8 cm. long, 3–5 cm. wide, regularly revolute, entire, shortly and sparsely pubescent above, appressed pubescent beneath, little rugose; lateral racemes about 1 dm. long, pubescent with stellate and stipitate glandular trichomes intermixed; pedicels 1–2, in fruit 3–4 mm. long; calyx tubular, 5-costate, appressed sericeous, truncate, 6 mm. long, teeth 1 mm. long, in fruit urceolate, 8–9 mm. long; corolla pale blue, about 13 mm. long, limb 7 mm. broad, inside as out closely appressed pubescent.—The var. *colombiensis* Mold., Phytologia 2: 18. 1941, has calyx only lightly puberulent or strigillose. F.M. Neg. 34314.

Amazonas: *Mathews 3171*, type; also the variety, fide author.—Huánuco: Muña, *3957*. Carpish, *Stork & Horton 9885*.—Cuzco: Marcapata, *Vargas 9704*.—Puno: Río Limbani, *Metcalf 30563*. Oconeque, *Metcalf 30595*. "Upatancar" (Vargas). To Colombia.

Duranta triacantha Juss. Ann. Mus. Paris 7: 77. 1806.

Much branched strongly spinose shrub a meter or two tall, the axillary subulate spines about 2.5 cm. long; branches somewhat 6-angled; leaves ternate or few, obovate-elliptic or oblong, subsessile at attenuate base, subacute or obtuse, mucronulate, less than 2.5 cm. long, entire or remotely serrate toward apex, coriaceous, often revolute, lustrous above, paler and punctate glandular beneath, early pubescent on nerves, glabrate; racemes reduced or elongate, axillary and terminal, paniculate; calyx truncate, plicate, 5-dentate, in fruit globose, the throat closed; corolla tube exserted, the limb pubescent.—Varies in indument, especially of the branches and racemes, the calyx often puberulent or only tomentose at apex on the plaits, sometimes the racemes tomentulose all over (Schauer); if Schauer is correct in this degree of specific variation, several of the plants proposed as species are of course not genetic entities. Type by Jos. de

Jussieu, Paris, labeled "Peru," is unfortunately in bud but the pubescent denticulate calyx is about 5 mm. long; it seems to be best matched by Ecuador specimens and is doubtfully in Peru. F.M. Neg. 39500.

Junín: *Ruiz & Pavón*, (*Dombey 253*).—Cuzco: Valle del Paucartambo, (*Herrera 2962*)? "Upa-ttancar" (Herrera), "sanacassa," "tantur-prieto." Ecuador.

12. RHAPHITHAMNUS Miers

Reference: Moldenke, Repert. Sp. Nov. 42: 62-82. 1937.

More or less spiny shrubs or small trees, the spines just above the axils of the opposite or ternate usually entire leaves and sometimes with 1 or 2 flowers between the larger spines, or the short racemes in the leaf-axils. Corolla lilac, limb ampliate, the unequal lobes spreading. Stamens didynamous, two slightly exserted, about medial in or above a ring of trichomes, the 2-lobed anthers divaricate at base. Calyx urceolate, soon adnate to the 4-celled 2-carpellate ovary, each carpel 2-celled, each cell with a single erect anatropous ovule. Drupe globose, blue, fleshy, with 2 suborbicular plano-convex smooth stones excavated at base of inner face.—Related to *Citharexylum* with parallel anther cells and to *Duranta* with similar fruiting calyx but 4-stoned (8-seeded) drupes; sometimes cultivated for ornament (Moldenke).

Rhaphithamnus spinosus (Juss.) Mold. Repert. Sp. Nov. 42: 69. 1937. *Volkameria spinosa* Juss. Ann. Mus. Paris 7: 76. 1806. *Citharexylum cyanocarpum* Hook. & Arn. Bot. Beech. Voy. 58. *pl. 11.* 1832, fide Moldenke.

Branchlets mostly spiny, somewhat puberulous, spines a half cm. to nearly 4 cm. long; petioles 1–3 mm. long; leaves finally coriaceous, lustrous, rather elliptic to subrotund, 0.5–4 cm. long, 0.4–2.5 cm. wide, usually somewhat acute and mucronate, acute to cordate at base, glabrous to strigose; calyx campanulate, 2–4 mm. long, 1.3–2.6 mm. wide, apparent in fruit only by the 5 tiny teeth in the depressed top of the drupe; racemes 1–5-flowered, strigose; corolla tube 12–20 mm. long, the lobes 2.6–3.3 mm. long, 1.2–2.9 mm. wide; fruit 5–12 mm. in diameter, blue or violet, lustrous when fresh; nutlets 2, about 6 mm. long and wide, each 2-celled, 2-seeded.—This shrub becomes covered with flowers; gradually filling with fruits, it is beautiful (Ruiz & Pavón). Moldenke has listed this as found in

Lambayeque; Soukup, Biota 1: 29. 1954, showed that the specimen no doubt came from Chile, possibly from Arica, since the collector was there. Type by Dombey at Paris, without data. Illustrated (as *R. cyanocarpus*), Trans. Linn. Soc. Lond. 27, *pl. 26;* Bot. Mag. 111, *pl. 6849* (as *Duranta umbellata*).

Tacna (probably, since perhaps collected in Arica). Chile; Argentina. "Haumun," "chaguis" (both, Ruiz & Pavón).

13. AMASONIA L. f.

Taligalea Aublet, Pl. Guian. 2: 625. 1775.

Reference: Moldenke, Repert. Sp. Nov. 46: 193–228. 1939.

More or less ligneous, often branched from the base, the leaves alternate, opposite or scattered, usually crowded below the terminal inflorescence of many often trichotomous cymes, these somewhat secund and leafy-bracted. Flowers yellow, large, single or in three's, the broadly campanulate calyx subequally 5-lobed, the corolla with elongate tube and slightly bilabiate limb. Stamens 4, didynamous, inserted near base, the anthers bifid at base. Style exserted, stigma parted. Ovary 4-celled, each cell with 1 lateral ovule. Calyx as bracts often colored, scarcely accrescent, the drupe with 4 (1–3) finally separate pyrenes.—Name published in 1781 but conserved (unfortunately, Moldenke), probably for George Anson (lived to 1762), who traveled in America (J. H. Barnhart).

Besides the following, other Brazilian species will probably be discovered within Peru.

Amasonia lasiocaulos Mart. & Schauer ex Schauer in DC. Prodr. 11: 678. 1847; 208–210.

Branches, peduncles, pedicels (3–7 mm. long) more or less short-hirsute, the red trichomes viscid; petioles to 2 cm. long, sometimes almost lacking; leaves usually repand or subcrenate, obovate-elliptic or oblanceolate, cuneately long-attenuate into petiole, acute or shortly acuminate, 7–24 cm. long, about 2–9 cm. wide, membranous, green or beneath red-purplish, sparsely puberulent, or pilose above, no glandular disks but punctate beneath; panicles to 2 dm. long or larger; bracts red, often ochrous beneath, oblong-lanceolate or elliptic, 1–3.5 cm. long, 5–17 mm. wide, stiped; calyx chartaceous, 9–10 mm. long, 7–10 mm. wide, puberulent, the acuminate lobes 6–7 mm. long; corolla tube to 3 cm. long, glandular pubescent only without, the lobes 4–5 mm. long; stamens long-exserted; calyx in

fruit 1–1.5 cm. long and wide, glabrous within, lobes to 9 mm. long; fruit about 6 mm. in diameter, lustrous.

San Martín: (*Allard 20522*). Brazil.

14. CORNUTIA [Plumier] L.

Reference: Moldenke, Repert. Sp. Nov. 40: 153–205. 1936.

Tall often lax and somewhat tomentulose-pubescent trees or shrubs with opposite entire leaves and many-flowered cymes usually disposed in terminal panicles. Calyx various in shape, entire to sinuate or minutely dentate, rarely lobed, scarcely or not accrescent in fruit. Corolla limb pubescent all over within, 4-parted, 3 lobes ovate, subequal, valvate. Perfect stamens 2, medially (or higher) affixed, the ovoid anther cells finally divaricate, the connective stout; staminodia filiform. Ovary pubescent, 4-celled, the solitary ovules lateral below the cell-apex. Stigma minutely and unequally 2-cleft. Drupes globose, fleshy.—Plumier's name (as decreed by modern savants, validated by Linnaeus) records the botanical observations of an early seventeenth century Canadian physician, Jacques Philippe Cornut.

Calyx about 2.5 mm. long.....*C. odorata.*
Calyx about 1 mm. long.....*C. microcalycina.*

Cornutia microcalycina Pavón ex Mold. Repert. Sp. Nov. 40: 173. 1936.

Resembles (ex char.) *C. odorata;* leaves typically short-tomentulose beneath; bractlets 2–4 mm. long; calyx about 1 mm. long, 1.5 mm. across; corolla short-pubescent; filaments densely, staminodes sparsely pilose; style short-pubescent; ovary densely long-hirsute.—Some Colombian material referred here by Moldenke has leaves merely puberulent; some Central American specimens have villous ones; calyx size according to monographer's key is not a constant character, *C. grandifolia* (Schlecht. & Cham.) Schauer, 163, as interpreted by him, having calyces 1–2.5 mm. long and wide; this variable species of Mexico and Central America apparently may have a much wider distribution. The name of Pavón was in herbaria under the synonym *Hosta* Jacq.; the author's name is often, on at least some of the Ruiz and Pavón collections, cited in this work under both names.

Junín: *Killip & Smith 26133.* Without data (*Ruiz & Pavón*). To Colombia.

Cornutia odorata (Poepp. & Endl.) Poepp. ex Schauer in DC. Prodr. 11: 681. 1847; 176. *Hosta odorata* Poepp. & Endl. Nov. Gen. & Sp. 3: 63, *pl. 269*. 1845.

Branchlets stout, nodulose, acutely 4-angled, the nodes annulate, early densely puberulent as the petioles (2–7.5 cm. long), leaves especially beneath, peduncles (3–6 cm. long), and cymes, including the cupulate entire or minutely denticulate subsessile calyces, these about 2.5–3.5 mm. long and wide; leaves broadly elliptic, attenuate to base, acuminate, 1–3.5 dm. long, 6–19 cm. wide, strigillose-puberulent above, membranous or subchartaceous, secondary nerves slender, 8–12 pairs, not conspicuous, the veins obscured above; inflorescence mostly thyrsoid, to 4 dm. long, consisting of 9–12 pairs of several times bifurcate cymes; bractlets linear, 5 mm. long; corolla typically spreading, villosulous, tube about 1 cm. long, the 2 larger subovate lobes about half as long; filaments sparsely, style densely pilose, staminodes glabrous; ovary hirsute; calyx in fruit patelliform, puberulent, the pubescent drupe about 3 mm. thick.—Northern forms with appressed or denser or less indument have been given taxonomic standing; the specific status of this entity is open to review; compare note under *C. microcalycina* Pavón. A bush of stream banks, to over 2 meters tall, the large panicles of pale violet flowers with a strong lavender scent (Svenson); sometimes a tree, 8 meters high. F.M. Neg. 7885.

San Martín: Chazuta, *Klug 4004*.—Loreto: Yurimaguas, *Poeppig*, type. Near Iquitos, *Klug 394; 662; Williams 8223*. Florida, *Klug 2159*. To Colombia. "Dona" (Huitoto), "tal" (Williams).

15. VITEX [Tourn.] L.

Reference: Moldenke, Phytologia 5: 142–176, 186–224, 257–280, 293–336. 1955; l.c. 343–393, 404–464. 1956; l.c. 465–507. 1957; l.c. 6: 13–64, 70–128. 1957; l.c. 129–192, 197–231. 1958.

Shrubs or trees characteristically with digitately compound leaves (rarely reduced to one leaflet or entire) and irregular flowers in variously developed or disposed cymes. Calyx often slightly unequally 5-dentate or 5- (rarely 3-) lobed. Corolla sub-bilabiate, the 2 posterior lobes ordinarily shorter. Stamens 4, didynamous; cells subparallel to divergent or arcuate. Ovary finally usually 4-celled, the single ovules lateral, medial or higher. Stigma acutely cleft. Drupe rarely subincluded, the calyx often accrescent. Seeds obovoid or oblong without endosperm.

Moldenke lists a bibliography, l.c. 5: 142–145, 257–258, much of it generally applicable and mostly at least repeated by himself when a particular citation is concerned; a pertinent reference is an earlier (1908) but still helpful résumé of the Amazonian species by the able Swiss botanist Huber, Bol. Mus. Goeldi 5: 209–222, with plates. Here, as usual, the monographer, notwithstanding his wealth of information, has avoided much original expression of specific lines; perhaps his extremely detailed but often indecisive work will some time be the more useful to local botanists for clarification.

The "Agnus-castus," or Chaste Tree, a useful ornamental, although it dies back where there is frost, is said to be adventive in some tropical lands and was in the botanical garden at Lima in 1946; it is *V. agnuscastus* L., Mediterranean (Moldenke, l.c. 5: 161–176, 186–196), and is marked by usually 7 (5–9, reduced to 1–3) narrow (central one often 5–10 cm. long, 1–2 cm. wide) unequal leaflets, white-puberulent beneath, and narrow elongate panicles of lilac or purple flowers about 8 mm. long.

Inflorescence usually a dm. long or longer and rather paniculate or dichotomous-cymose.
  Calyx sub-bilabiate, nearly 5.5 mm. long; cymes supra-axillary. *V. Klugii.*
  Calyx 5-dentate or -lobate, 2–3 mm. long; cymes axillary or also terminal.
    Peduncles about as long as or longer than petioles. *V. compressa.*
    Peduncles much shorter than petioles.
      Leaflets 5; petioles often ampliate at apex. . . . . *V. cymosa.*
      Leaflets 3–7; petioles slender, not or little ampliate. *V. pseudolea.*
Inflorescence more or less simply cymose.
  Cymes mostly 3-flowered; calyx tubular-funnelform, to 2 cm. long. *V. triflora.*
  Cymes at least mostly or often many-flowered; calyx small.
    Peduncles shorter than petioles; calyx canescent.
      Leaflets long-petiolulate; calyx in fruit lax, mucro-crenate. *V. pseudolea.*
      Leaflets subsessile or short-petiolulate; fruit enclosed in dentate calyx . . . . . *V. gigantea.*
    Peduncles longer than petioles.
      Calyx gray, obsoletely dentate. . . . . *V. orinocensis.*
      Calyx flavescent, obviously dentate. . . . . *V. flavens.*

Vitex compressa Turcz. Bull. Soc. Bot. Mosc. 36, pt. 2: 224. 1863; 295.

Branchlets obtusely quadrate, lenticellate, minutely puberulent, the leaf-scars corky; petioles flattened above with apical disk to 6 mm. wide, slender, 5–12 cm. long, more or less puberulent as the 3–7 subequal petiolulate leaflets at least beneath and the axillary but terminally crowded inflorescences, these usually 1–3 dm. long, 3–5 cm. wide, consisting of 5–8 pairs of well-peduncled dichotomous cymes; leaflets oblong-elliptic, the central one 7–26 cm. long, 2.5–11 cm. wide, all usually lustrous above, undulate, with 7–12 lateral nerves and fine reticulation rather prominent, especially beneath; pedicels 1–3 mm. long; bracts few, small, entire to 3-petiolulate; bractlets many, lanceolate to linear, 3–10 mm. long; calyx 2–3 mm. long and wide, the acute teeth or lobes usually about 0.7 mm. long; corolla 12–13.5 mm. long, tube 4–5.2 mm. long, puberulent-pilosulous only above, more or less long-pilose within, upper lip lobes 3.6 mm. long and wide, central lobe lower lip to 6.5 mm. long, 8.5 mm. wide, sublanate or bearded at yellow base; filaments completely pilose, the purple anthers widely divergent; fruit 1–1.5 cm. long and thick, glabrous, 4-seeded.—Becomes a stout tree to 30 meters tall, the straight trunk to a meter in diameter; flowers blue to purple, fragrant. Moldenke says that it is cultivated in Peru and British Guiana, but he cites only a collection by Pavón, without data.

Peru(?): See above. To Colombia, Trinidad and Brazil.

Vitex cymosa Bert. ex Spreng. Syst. Veg. 2: 757. 1825; 307.

Branchlets with small pith, early grayish or yellowish puberulent, leaf-scars elevated; petioles flattened and somewhat sulcate above, often somewhat ampliate-disciform apically, to 1.5 dm. long, densely puberulent or short-pubescent as the twigs and leaves beneath, the trichomes at first more or less yellowish especially on the petiolules; leaflets 3–7, usually very unequal, the central one oblong or elliptic to obovate or oblanceolate, several cm. to nearly 2.5 dm. long and about 2.5–7 cm. wide, normally acute to obtusely caudate-acuminate, acute or usually attenuate to base, in age at least firm-chartaceous, the 10–20 secondary nerves and fine reticulation rather prominent beneath; cymose inflorescence much shorter than subtending petioles, 1–4 or several times dichotomous, the branches widely divaricate; pedicels 1–2 mm. long, bracts often present, 1–1.5 cm. long; bractlets linear, to 4 mm. long; calyx densely puberulent, 2–3 mm. long, 2–5 mm. wide, the ovate teeth obtuse or acute; corolla tube

6–7 mm. long, puberulent above the calyx, the 4 small lobes about 4 mm. long, half as wide, obtuse, the larger lobe rounded, crisped, about 7 mm. long, 8 mm. wide; fruiting calyx 5 mm. long, 12 mm. across, finely strigose, coriaceous, the 4 or 5 lobes often obscurely dentate; fruit purplish black, about 1–2 cm. long, 1–1.5 cm. thick.—Shrub or sometimes a tree recorded to 25 meters tall, the bark fissured; flowers appearing before leaves are mature (Moldenke) in various shades of blue to violet-rose, odorless, the succulent fruits edible. Illustrated, Bol. Mus. Goeldi 5: *pl. 4*.

Lima: Near Chosica, (*Weberbauer 5341*). To Colombia, Brazil, Bolivia, Patagonia.

Vitex flavens HBK. Nov. Gen. & Sp. 2: 246. 1818; 336, 359. *V. Rusbyi* Mold. Phytologia 1: 103–104. 1934, fide author.

Branchlets, petioles (–1 dm. long), peduncles (–3 cm. long), and crowded axillary cymes (2.5–5.5 × 2–3.5 cm.) flavescent or ferrugineous-furfuraceous or velvety tomentose, even the corolla; leaves 5–7 foliolate, the sessile (–6 mm. petiolulate) obovate-oblong to elliptic shortly acute or acuminate leaflets acute to attenuate to base, to 7 cm. long, merely 3 cm. wide, appressed pubescent, finally glabrate above, more or less canescent (or ferrugineous) tomentose beneath and densely glandular punctate; calyx campanulate, 2.5–3.5 mm. long and little wider, shortly subappressed pubescent, sub-bilabiate, rather acutely 5-dentate; corolla tube broadly cylindric, about 5 mm. long, nearly 2 mm. wide at glabrous base, 3.3 mm. wide at top, pilose within, 4 lobes 2–3 mm. long and wide, the spathulate lower 6–7 mm. long, apically expanded to about 4.5 mm. wide; stamens and style exserted 5 mm., the filaments pilose below, the style glabrous, branchlets (stigmatic) 0.5 mm. long.—*V. Rusbyi* was based on a tree 15 meters tall, the description particularly for flowers compiled from Moldenke who recognized considerable variation in the vegetative characters. Origin of type perhaps Peru, without data. Known to attain 20 meters; used for construction, at least in Ecuador. Illustrated, Bol. Mus. Goeldi 5: *pl. 4*. F.M. Neg. 39494.

Loreto: *Tessmann 3247; 4492; 4587*. To Colombia and Amazonian Brazil. "Pechiche" (Ecuador), "tarumá" (Brazil).

Vitex gigantea HBK. 2: 245. 1818; 373.

Branchlets terete, subcompressed, softly tomentose-hirsute, to more or less puberulent; petioles to 1 dm. long, rather flat, rarely canaliculate, pubescent; leaves 3–5-foliolate, the shortly petiolulate

or subsessile oblong-elliptic leaflets acute to acuminate both ends, the intermediate usually 1–2 dm. long, often about half as wide, the outer much smaller, all entire, finely reticulate-nerved, especially beneath, glabrous or puberulent above, paler and flavescent pubescent beneath; peduncle axillary, pubescent, to 2.5 cm. long; cymes 3–6-flowered; calyx campanulate, the 5 subobtuse teeth approximate; corolla violet, tube short, cylindric, throat dilated, the lower lip 3-lobed, spreading, with a pilose spot at base, the middle lobe 3 times longer than the others; drupe edible, surrounded by the calyx.—Noted by authors as a beautiful tree with globose crown, the wood very hard; originally from Guayaquil. Obviously very closely related to *V. cymosa* Bert. and *V. flavens* HBK.; the Peruvian specimens with young leaves are sparsely puberulent above and Moldenke thinks it is not certain that they are the same species. He gives a description of the valuable wood.

Loreto: Pongo de Manseriche, *Mexia 6177;* (*Tessmann 4723*). Ecuador. "Pechiche" (HBK.), "moconto."

Vitex Klugii Mold. Phytologia 1: 101. 1934; 422.

Slender tetragonous branchlets, petioles (flattened and canaliculate, 2–6 cm. long), and cymes including the calyces more or less minutely strigose or puberulent, nodes often annulate, central petiolules subequal (or central slightly longer), 2–12 mm. long; leaflets 3, elliptic to subobovate, 6–22 cm. long, 2.5–10 cm. wide, entire, acute at base, acuminate, membranous, glabrous or sparsely strigillose especially beneath, lustrous both sides; secondary nerves 10–18, prominent beneath; cymes often supra-axillary, 4.5–9 cm. long, 2–7.5 cm. wide, dichotomous, branchlets (as peduncles) complanate apically; pedicels reduced or filiform, 1.5–2 mm. long; bracts often 2, foliaceous; calyx tubular-campanulate, 4–5 mm. long, 5-lobed, bilabiate; corolla tube 7–9 mm. long, densely strigose without, long pilose at throat within, lobes subequal, ovate, 3–4 mm. long, acute; stamens subequal, exserted; fruiting calyx campanulate-cupuliform, 5–6 mm. long, 10–12 mm. across, strigose without, rather unevenly 5-lobed, lobes cusped; fruit hard, dry, 12–17 mm. long, 6–9 mm. thick, umbilicate both ends, puberulent.—Type a 4-meter tree, the flowers blue and white (Klug); known to attain 20 meters, upper corolla lip white within (Moldenke).

Loreto: Mishuyacu near Iquitos, *Klug 625*, type. Colombia; Brazil.

Vitex orinocensis HBK. Nov. Gen. & Sp. 2: 247. 1818; 26.

Obtusely quadrate lenticellate branchlets, as petioles and peduncles—both flattened, to 5 cm. long—as well as the axillary cymes subcanescent with a fine pulveraceous indument; leaflets 1–5, very unequal, the 2 lowest subsessile, the others more or less petiolulate, elliptic to obovate-oblong, narrowed to base, usually caudately and obtusely acuminate, the central 5–11 cm. long, (2) 3.5–4 cm. wide, the others smaller, all membranous-subcoriaceous, typically glabrate or veins pulverulent, lustrous, reticulate-veined; cymes subumbellately or corymbosely dichotomous, bracts typically none; bractlets linear, few; calyx shortly pedicellate, campanulate, less than 2 mm. long, truncate, obsoletely or minutely dentate; corolla blue, middle lobe of basally barbate lower lip larger, subcordate, undulate-crenate, the ampliate tube to 7 mm. long, limb 5–10 mm. wide; fruit unknown to Moldenke.—The Peruvian form, var. *multiflora* (Miq.) Huber, Bol. Mus. Goeldi 5: 217, *pl. 3, figs. 19, 20.* 1908 (as var. *amazonica* Huber, fide Moldenke), has pedicels very short or obsolete, foliose bracts often developed, leaflets rounded-apiculate or acute; corolla lilac, or blue to violet; fruiting calyx patelliform, 4 mm. across, subentire; drupe oblong-obovoid, 8 mm. long, 6 mm. thick, nigrescent. After, as elsewhere, Moldenke, who notes that the leaves usually discolor in the variant, rarely brunnescent in the type. Var. *glabra* Mold., l.c. 4: 293. 1953, may occur; type from Amazonian Colombia. F.M. Neg. 39495.

Loreto: (*Kuhlmann*, fide Moldenke). To Colombia and the Guianas.

Vitex pseudolea Rusby, Mem. N. Y. Bot. Gard. 7: 341. 1927; 91.

Very slender petiole about apically disciform, somewhat shorter (5.5–10 cm. long) than middle leaflet (7–15 cm. long), the 5 petiolules 6–12 mm. long, the smaller blades 5–10 cm. long, 1.5–4 cm. wide, the outer smaller, all oblanceolate, attenuate to base, abruptly and shortly acute or obtusely acuminate, membranous, finally lustrous above, midrib tomentulose (as petiole), secondaries about 10–20 pairs, venation strongly reticulate; peduncles 1.5–3 cm. long, crowded on young twigs; cymes lax, about 3 times dichotomous, canescent-puberulent; pedicels slender, 1–3 mm. long; corolla blue or lilac, larger petal darker; stamens blue, filaments translucent (Moldenke); calyx violet-green, subcrateriform (in young fruit), faintly 5-nerved, reticulate, lax, 5-mucrocrenate; fruit purple-black, size and taste of olive (Olea). —Near *V. gigantea* HBK. but not ferrugineous-tomentulose, and,

especially, *V. cymosa* Bert., the flowers said to appear before the leaves are expanded (always?); perhaps conspecific with *V. cymosa* (Moldenke); ex char. the word "perhaps" should read "probably."

The sweet fruits are eagerly eaten by children, and the bark is used by elders for rheumatism.

San Martín: (*Ferreyra 4829*, det. Moldenke). Bolivia. "Aceituno del monte."

Vitex triflora Vahl, Eclog. Amer. 2: 49. 1798; 156. *Macrostegia Ruiziana* Nees in DC. Prodr. 11: 218. 1847.

Quadrate branchlets and axillary peduncles glabrate to more or less ferrugineo-tomentose puberulent; petioles 1.5–6 cm. long, slender, flat and canaliculate above; leaflets 3 (1–5), entire, subsessile (petiolules 1–3 mm. long), usually subequal, obovate-oblong to elliptic, more or less attenuate to base, somewhat obtusely acuminate or cuspidate, about 7–15 (20) cm. long, membranous (to subcoriaceous), pale green, typically glabrous or early pubescent, glabrate or strigillose beneath; nerves 8–15 pairs, rather prominent as veins both sides; cymes mostly 3- (rarely several-) flowered, often bifid, the peduncles about equaling the petioles; pedicels 1–5 (7) mm. long, puberulent; calyx papery, tubular-funnelform, to 2 cm. long, with 5 foliaceous lanceolate often spreading lobes, strongly accrescent in fruit, bilabiate; corolla violet (or blue), cylindric tube about 2.5 cm. long, the exserted part fulvous-sericeous, limb glabrous within, upper lip erect, middle rotund lobe of lower lip barbate at base; stamens little exserted; drupe edible but closely pubescent, to 1.5 cm. long, 1 cm. thick, with aroma of Eau de Cologne, especially in drying (Moldenke).—Var. *quinquefoliolata* Mold., Phytologia 1: 104. 1934, was based on a Río Acre specimen (*Krukoff 5765*); var. *floribunda* Huber, Bol. Mus. Goeldi 5: 215, *pls. 2, 3*. 1909, is marked by subcoriaceous leaves as well as many flowers. Small slender tree, flowers sky blue (Williams); drupes fleshy, edible. Illustrated, Mart. Fl. Bras. 9: *pl. 49*. F.M. Neg. 22779; 5885 (*Macrostegia*).

Loreto: Iquitos, *Klug 1492; 1254;* (*Ducke 7561*). Yurimaguas, *Williams 4195; Klug 2791*.—Río Acre: *Ule 9727* (var. *floribunda*, probably in adjacent Peru). Bolivia to the Guianas. "Tahuari" (Klug), "taruma."

16. CLERODENDRUM [Burm.] L.

References: Schauer in DC. Prodr. 11: 658–675. 1847; Moldenke, Fl. Suriname 4, pt. 2: 313–321. 1940.

Allied to *Vitex* but the opposite or rarely verticillate leaves simple, the flowers often showy, the calyx little accrescent, ordinarily spreading beneath the 4-sulcate 4-seeded fruit. Corolla lobes subequal. Stamens long-exserted.—Sometimes (especially in horticulture), and more correctly, written *Clerodendron*, which form therefore I prefer. Clerodendrons have long been prominent in cultivation; several, besides *C. fragrans* Vent. and *C. Thomsonae* Balf. f., included in the text, are probably grown in Peru, for instance, *C. japonicum* (Thunb.) Sweet (i.e. *C. fragrans* Willd. Enum. Hort. Berol. 2: 659. 1809, not Vent.) and *C. Bungei* Steud. (*C. foetidum* Bunge, not D. Don), both with red flowers 2–3 cm. long and opposite cordate leaves, those of the former resinous-squamulose beneath, of the latter glabrate; also, one may expect in gardens *C. indicum* (L.) Ktze., with mostly ternate acute-based glabrous leaves, white or yellow flowers.

Leaves 2–3 cm. long, rounded-obtuse or retuse.....*C. inerme.*
Leaves about 5 to many cm. long, obtuse to acuminate.
Calyx white to roseate, 2 cm. long or longer.....*C. Thomsonae.*
Calyx green or not showy, small.
Leaves subobtuse or acute both ends; calyx lobes ovate, acute.
C. molle.
Leaves acuminate or at base subcordate.
Leaves long-attenuate to base, entire or faintly repand.
C. Tessmannii.
Leaves subcordate at base, repand.....*C. fragrans.*

Clerodendrum fragrans Vent. Jard. de Malm. *pl. 70.* 1804. *Volkameria japonica* Jacq. Hort. Schoenbr. 3: 48, *pl. 338.* 1798, not Thunb., 1784.

Branchlets obtusely tetragonal, subtomentose; leaves subcordate, broadly ovate, subrotund or shortly acuminate, unevenly coarsely to repand-dentate, hirtellous above, pubescent and glandular beneath on nerves, especially at union with the long petiole; panicles terminal, subsessile, compact, many-flowered; bractlets many, lanceolate or oblong-elliptic, 1.5–3 cm. long, attenuate both ends, pelviform-glandular as the tubular-obconic calyces, these about 12 mm. long, also puberulent and with 5 narrowly subulate reflexed lobes to 1 cm. long; corolla tube glabrous, about 2.5 cm. long, the subequal obovate lobes reflexed.—Flowers pink to bright roseate or white, fragrant, in the cultivated state known as var. *pleniflorum* Schauer, the stamens and pistil modified in some degree; the species, native to China, is more

or less naturalized in tropical America. Illustrated, Bot. Mag. *pl. 1834;* Bot. Reg. ser. 2, *pl. 41.*

San Martín: Chazuta, *Klug 4032.*—Loreto: Iquitos, *Williams 1465.* China; tropical America.

Clerodendrum inerme (L.) Gaertn. Fruct. 1: 271. 1788; 660. *Volkameria inermis* L. Sp. Pl. 637. 1753. *V. buxifolia* Willd. Enum. Hort. Berol. 2: 658. 1809. *C. buxifolium* (Willd.) Spreng. Syst. Veg. 2: 758. 1825.

Leaves entire, obovate, retuse or obtusely acute, to about 2 cm. long, nearly as wide, lustrous; pedicels axillary, 1–3-flowered; calyx truncate, apiculate-denticulate, about 4 mm. long; corolla white, the tube often 18 mm. long, the lobes about 7 mm. long.—Ordinarily a low shrub at most about 1 meter tall, the opposite or ternate leaves sometimes 5 cm. long, especially in cultivation, the Peruvian specimen possibly obtained from an adventive individual. F.M. Neg. 24622.

Peru: Without locality, *Ruiz & Pavón.* East Indies; Philippines.

Clerodendrum molle HBK. Nov. Gen. & Sp. 2: 244. 1818; 659.

Branches glabrous or pilose, subaculeate, the petioles ternate, 8 mm. long; leaves entire, ovate-elliptic to subrotund, acute to attenuate to base, subobtuse, mostly about 5 cm. long or longer, glabrous above, softly canescent beneath, reticulate-veined; peduncles axillary and terminal, longer than leaves; cymes 7–9-flowered; bracts linear, pubescent as the campanulate calyx, this with 5 ovate acute spreading lobes, cupulate and little accrescent in fruit; corolla rubescent, the cylindric tube less than 2.5 cm. long, the limb with 5 oblong lobes; stamens very long, secund; drupe baccate, globose, sulcate, with 4 nutlets.—Flowers fragrant. Type from Guayaquil. F.M. Neg. 39497.

Peru: (Moldenke). Ecuador.

Clerodendrum Tessmannii Mold. Phytologia 1: 448. 1940.

Branchlets tetragonous, stout, often flattened at nodes and there more or less strigillose; petioles often crowded, stout in age, to 2 cm. long; leaves elliptic, cuneate at base, short-acuminate, about 1–3 dm. long, nearly 3–8 cm. wide, chartaceous, glabrous, the very slender secondary nerves 8–11; inflorescences axillary or supra-axillary, the opposite solitary cymes 8–15 cm. long, 2–6 cm. wide, 2–7-flowered; peduncles stout, 4–9 cm. long, glabrate as the thick 5–12 mm. long

erect-ascending pedicels; bracts none, bractlets few, to 12 mm. long; calyx about 1 cm. long, 8 mm. across at top; corolla tube 22 mm. long, its limb about 2.5 cm. in diameter.—The Ruiz and Pavón specimen at Geneva referred to *C. inerme* (L.) Gaertn. may rather be this species, if there are two entities; the former may have obtusely acuminate leaves, corolla tube 2–3 cm. long.

Ayacucho: Río Apurímac Valley, *Killip & Smith 22998*.—Loreto: Río Ucayali, (*Tessmann 3244*, type). Río Mazán, *José Schunke 338*.

Clerodendrum Thomsonae Balf. f. Trans. Bot. Soc. Edinb. 7: 265, 580, *pls. 7, 16*. 1863.

Shrubby or soon twining, more or less purplish-puberulent, especially the branchlets, petioles (1–3 cm. long), and peduncles, these in the uppermost axils, the spreading cymes laxly few-flowered; leaves elliptic, 5–15 cm. long, about half as wide, rounded at base, shortly acuminate, membranous, glabrate; bractlets linear; calyx about 2–2.5 cm. long, early yellowish, pure white during anthesis, dull roseate in age, 5-parted to base, alately 5-angled, the lobes acutely acuminate; corolla bright red, about 2.5 cm. long, the spreading lobes 6–8 mm. long, acute; fruit trichomes, black, the nutlets joined by a brilliant red aril; stamens long-exserted.—Named for the wife of a missionary, W. C. Thomson, whose generous interest in floriculture resulted in her sending in 1862 a living plant to the Botanic Garden at Edinburgh. Cultivated at Lima and elsewhere for the attraction of the white or tinted calyces and red flowers; apparently becoming established in clearings. Illustrated, Bot. Mag. *pl. 5313*.

San Martín: Tarapoto, *Williams 5923*.—Loreto: Iquitos, *Mexia 6501a; Williams 7923*. Yurimaguas, *Williams 4029*. Pebas, *Williams 1822*. Tropical Africa. "Brinco-de-dama."

17. CALLICARPA L.

Reference: Moldenke, Repert. Sp. Nov. 39: 288–317. 1936; 40: 38–131. 1936.

More or less obviously stellate-farinaceous pubescent shrubs or trees, rarely glabrate or glabrous, opposite, usually serrulate-crenulate leaves and with abundantly flowered cymes, these sessile or peduncled, axillary or supra-axillary. Flowers usually polygamous. Calyx 4-sinuate to cleft-dentate (rarely 5-dentate), not accrescent in fruit. Corolla tube straight, ampliate, the limb 4- (5) cleft, the equal lingulate lobes imbricate. Stamens 4 (5), equal, at or near base

(Moldenke). Anthers oblong-elliptic, the cells parallel. Style capillary, stigma depressed or peltate. Ovary 4-celled, the 2 ovules affixed medially or higher. Drupe globose or depressed, fleshy, with 4 (or fewer) 1-seeded pyrenes.—Punctate glands are present on the flowers, particularly on the anthers. Ovary absent or rudimentary in small flowers.

Callicarpa acuminata HBK. Nov. Gen. & Sp. 2: 252. 1818; 38.

Branchlets, petioles (mostly 1–2.5 cm. long), and peduncles (1.5–6.5 cm. long) early densely floccose tomentose, at least the branches glabrate or glabrous; leaves ovate-oblong, entire to acutely serrate, acute at base or somewhat attenuate into petiole, acute, acuminate or often caudate-acuminate, mostly about 1–2.5 dm. long, 4–10 cm. wide, membranous, more or less stellate-furfuraceous above or subglabrous in age, densely tomentose or floccose, but glandular punctate beneath; cymes mostly in the upper axils, often laxly corymbose, to 2 dm. long; bracts (if present) few, to 3.5 cm. long, 1 cm. wide; bractlets linear, 5–10 mm. long, tomentose; calyx about 1–1.5 mm. long and wide, granulose pulverulent, erose or obscurely 4-denticulate; corolla white or greenish, tube to 2.5 mm. long, lobes less than 1 mm. long, rounded, crimped or barely 2-lobed; stamens exserted; calyx in fruit patelliform, 2–3 mm. wide, truncate, entire, the dark purple subglobose glabrous fruit 3–4.5 mm. long.—*C. longifolia* Lam., native to Malay, reported as cultivated at Lima, is less tomentose, has oblong-lanceolate leaves about a third as wide as long, smaller pink-lavender flowers, smaller pink or white fruits. Slender shrub or tree, sometimes said to attain 10 meters, the thin bark purplish or pale brown (Williams).

San Martín: Chazuta, *Klug 4144*. Tarapoto, *Williams 6168; 6275; 6817*. Juanjuí, *Klug 3879*. Bolivia to Mexico.

18. AEGIPHILA Jacq.

Reference: Moldenke, Brittonia 1: 245–477. 1934.

Shrubs or trees, sometimes lianas, with usually entire opposite rarely ternate or approximate leaves and cymes (sometimes paniculate or variously modified) subsessile, peduncled in the upper leaf axils or terminal or both of white or tinted flowers similar to those of *Callicarpa* but often more or less (never truly, Moldenke) dioecious (heterostylous). Calyx tubular, turbinate or campanulate, truncately 4–5-dentate or -lobed, accrescent in fruit. Corolla segments

as stamens 4 or 5, latter exserted (male flowers), affixed above the base. Ovary imperfectly or perfectly (Moldenke) 4-celled, the single ovule lateral. Style filiform, the bifid stigma with more or less obvious branches. Drupes somewhat exserted, normally 4-seeded, often dry.

Like many plants of warm regions some species at least originally found as shrubs probably become scandent when immediate environment makes this possible; naturally, too, plants flowering as shrubs may live to become trees.

The monographer prepared two plates—Phytologia 4: 428. 1953—that illustrate the use of his terms, particularly as these apply to the calyx. Of course I have had to depend upon his revision in compiling the following account and acknowledge my indebtedness; most descriptions are essentially his, many proposed species being based on one collection. While the genus contains numerous well-defined entities a lot of plants given equal standing seem to be obscure or they may be just hidden in the uniformity of characterization. The author himself has contrived only an artificial key, and mine, concerning the Peruvian names, is no doubt as dubious as some of the described species. Flowers are unknown for three plants given particular names by Moldenke: *A. glabrata*, *A. sordida*, *A. umbraculiformis*, and their key position (as for many others) is at most merely suggestive; also, many key characters are scarcely of taxonomic value.

Since compiling this account Julian Steyermark has kindly sent me a series of *A. mollis* HBK. including the type photograph and cotype of var. *intermedia* Mold. which has made me more skeptical of the value of *A. peruviana* Turcz. and thereby of other specific judgments.

Corolla, minus lobes, finally at least twice longer than calyx.
Panicles mostly axillary and subsessile or if somewhat peduncled, all axillary.
Leaves typically subsessile, basally cordate. *A. sordida*, *A. cordata*.
Leaves more or less petioled, basally acute to cuneate.
Calyx appressed canescent.
Bractlets obscure or none..... *A. integrifolia*.
Bractlets to 2 cm. long, linear..... *A. bracteolosa*.
Calyx glabrous or glabrate, trichomes few or not all appressed.
Leaves rounded or apiculate apically..... *A. multiflora*.

Leaves acute to acuminate.

Leaves broadly cuneate to base.

A. peruviana, A. filipes.

Leaves long attenuate to base.....*A. Haughtii.*

Panicles mostly or all terminal and peduncled or axillary but peduncled.

Plants not hirsute.

Bracts not involucral or lacking.

Inflorescence glabrate or glabrous, often lax and large.

Glandular disks all over leaves beneath.....*A. glabrata.*

Glandular disks all or mostly along midnerve.

Leaves falcate-plicate.....*A. glandulifera.*

Leaves not falcate-plicate.....*A. filipes.*

Inflorescence puberulent or at least compact, often small.

Leaves petioled, sometimes shortly.

Calyx shorter than 1.5 mm.; corolla tube about 3 mm. long.....*A. Smithii.*

Calyx about 4 mm. long; corolla tube to 9 mm. long.

A. sufflava.

Leaves subsessile.....*A. umbraculiformis.*

Bracts involucral.

Leaves abruptly short-caudate.....*A. insignis.*

Leaves acute or shortly acuminate.....*A. pulcherrima.*

Plants hirsute or shortly pilose-hirsutulous.

Stems spreading hirsute.....*A. hirsuta.*

Stems shortly pilose to densely puberulent.

A. peruviana, A. mollis.

Corolla, minus lobes, shorter than or to scarcely half exserted from calyx.

Leaves clearly decurrent, but sometimes rounded to decurrent base.

Pilose-hirsute (shortly), the leaves rounded-attenuate to decurrent base.....*A. mollis.*

Puberulent, the leaves rounded to the shortly decurrent base.

A. peruviana.

Glabrous, the leaves long-attenuate-decurrent.

Petioles well-defined.....*A. triflora.*

Petioles obscure.....*A. umbraculiformis.*

Leaves subcordate to more or less acute at base, or cuneate, but obscurely decurrent if at all.

Leaves (mature) glabrous or glabrate or the venation lightly pubescent; calyces minutely appressed strigillose.

Petioles lacking or nearly.....*A. umbraculiformis.*

Petioles about 5 (–8) mm. long; leaves rounded to acute basally, often almost half as wide as long.

A. chrysantha, A. vitelliniflora.

Petioles mostly longer (–1.5 cm.); leaves acute at base, often about a half to a third as wide as long.

A. longipetiolata, A. membranacea.

Leaves (mature) clearly pubescent one or both sides (expedient but probably variable character).

Calyx lobate or merely denticulate.

Leaves subcordate.....*A. sordida, A. cordifolia.*

Leaves rounded to subacute at base.

Stems spreading hirsute.....*A. ovata.*

Stems puberulent or tomentose.

Calyx as leaves beneath appressed flavescent pilose.

A. elegans.

Calyx as leaves strigose, villous-velutinous or tomentose.

Calyx 4-lobate; stamens 4.

Petioles to 5 mm. long; leaves rounded basally.

A. Pavoniana.

Petioles to 10 mm. long; leaves subacute at base.

A. velutinosa.

Calyx 5-denticulate; stamens 5.....*A. Mortoni.*

Calyx subfiliform dentate, the 5 teeth 5 mm. long..*A. cuneata.*

Aegiphila bracteolosa Mold. Repert. Sp. Nov. 33: 115. 1933; 456.

Simulates and resembles *A. integrifolia* in many respects but, especially, has a well-developed terminal panicle about a dm. long (–2 dm.), narrow, dense, with 3–7 notably bracteolate cymes as well as solitary often small subsessile axillary ones; petioles sometimes ternate, stout, 1–3 cm. long; leaves minutely apiculate-subcrenate; cymes 1–6 cm. long, 1–4.5 cm. wide; bractlets linear or nearly, to 2 cm. long; calyx 7–9 mm. long; corolla tube very narrow, to 12 mm.

long, abruptly ampliate, the lobes obtuse; stigma branches 5.5 mm. long; ovary glabrate.—A tree to 4 meters tall of non-inundated forest that has been confused with *A. arborescens* (Aublet) Gmelin (author), i.e. *A. integrifolia* Jacq. Illustrated, Phytologia 2: 435.

Loreto: (*Tessmann 5363*). To British Guiana.

Aegiphila chrysantha Hayek, Bot. Jahrb. 42: 171. 1908; 425.

Slender branches and branchlets subterete, tomentose or pilose, the younger indument often yellowish as on the petioles (4–8 mm. long) and the peduncles (1–2 cm. long) of the terminal panicle (this 5 cm. long, narrow); leaves entire, oblong or ovate, more or less rounded basally and acute, acuminate or cuspidate apically, 7–14 cm. long, 3–7.5 cm. wide, membranous, only midrib pilose above, secondaries (10–12 pairs) and veins especially beneath; cymes about 1.5 cm. long, 1 cm. wide; pedicels short or obsolete; bractlets few, linear, strigose, 2–5 mm. long; calyx campanulate, 3.5 mm. long, laxly strigose if at all, the lobes 1 mm. long; corolla funnelform, yellow, the tube 3–5 mm. long, acute lobes 1.8 mm. long; stamens 4, near mouth; stigma branches 4 mm. long, lanate; ovary depressed, 4-celled; fruit ovoid, flat both ends, the cupulate calyx antrorsely strigose, repand with 4 spreading points.—The var. *glabra* Mold., Phytologia 2: 60. 1941, refers to a collection with calyces quite glabrous determined by Standley as *A. Smithii* Mold. Moldenke originally identified *Klug 2104* and *2204* as *A. vitelliniflora* Klotzsch. Asplund noted flowers of a Loreto specimen as sordid yellow; fruit orange-red (Camp.); a liana (Klug). F.M. Neg. 34313.

San Martín: Moyobamba, *Weberbauer 1289*. Juanjuí, *Klug 3894* (type, var.).—Loreto: Florida, *Klug 2027; 2104; 2204*. Yurimaguas, *Poeppig 2314*, type (as indicated by Moldenke). Ecuador, Bolivia, Brazil. "Fetoró-ey" (Huitoto).

Aegiphila cordata Poeppig in Walp. Repert. 4: 118. 1845; 443.

Branches and branchlets as the axillary and terminal inflorescences densely villous-hirsute with ferrugineous spreading trichomes; leaves opposite or nearly, sessile or subsessile, ovate-oblong or rather elliptic, more or less cordate, shortly acuminate, 1–nearly 2 dm. long, 6–10 cm. wide, thin-membranous, ciliate as well as laxly strigose- or setose-hirsute both sides, especially on the nerves beneath; cymes solitary, 3–5.5 cm. long, about 3 cm. wide, more or less glaucescent, several crowded in the terminal panicle, this subsessile, to 14 cm.

long; pedicels 1–3 mm. long; bractlets filiform; calyx 4–5 mm. long, 4-dentate or -lobed; corolla red-purple, the tube 8–18 mm. long, lobes about 3.5 mm. long, 1.5 mm. wide; stigma branches about 2.5 mm. long; ovary flattened both ends.—One of the most distinctive species and would be beautiful in cultivation (Moldenke). *A. Froesi* Mold., Phytologia 3: 107. 1949, of Amazonas, Brazil, may be distinguished at once by its more conspicuous bractlets (1.5–3 cm. long, the lowermost often expanded apically) and quite glabrous truncate calyx (author). Poeppig specimen cited by Moldenke as *2158*, Phytologia 1: 195. 1937. F.M. Neg. 34312.

Loreto: Yurimaguas, *Poeppig 2815* (*2158?*, type). Caballo-cocha, *Williams 2083; 2318*.—Río Acre: *Ule 9720*. Colombia; Brazil.

Aegiphila cordifolia (R. & P.) Mold. Brittonia 1: 185. 1932; 445. *Callicarpa cordifolia* R. & P. Fl. Peruv. 1: 50, *pl. 77a*. 1798.

Branches spreading, much compressed at nodes, the lax virgate branchlets, petioles (7–13 mm. long), leaves early both sides and supra-axillary and terminal inflorescences densely ochreous pubescent; leaves decussate, entire, ovate or oblong, rounded, truncate or cordate basally, commonly acuminate apically, 9.5–18 cm. long, 3.5–7 cm. wide, membranous, dark green and in age distinctly rough above, secondaries 6–9 pairs; solitary cymes to half as long as leaves, the terminal panicle to a dm. long, 6 cm. wide, with few congested cymes; peduncles stout, 4–5.5 cm. long; pedicels 1–3 mm. long, incrassate in fruit; bractlets to 7 mm. long; calyx often constricted above, about 6 to nearly 7 mm. long, densely tomentose-hirsute with divaricate trichomes 1 mm. long, the 4 ovate lobes 1.3–2.6 mm. long; corolla tube 6 mm. long, pilose only within, the obtuse lobes about 4.5 mm. long; stamens 4, 1.5 mm. below mouth; filaments pilose; stigma branches 5.2 mm. long; fruit about 14 mm. long, 10 mm. thick, yellow or orange, glabrate, 4-seeded, the cupulate pubescent calyx 1 cm. long.—A medullose shrub or tree to 3.5 meters tall (Moldenke). F.M. Neg. 28378.

Amazonas: Chachapoyas, (*Mathews*).—Huánuco: Muña, *3922*. Panatahua, *Ruiz & Pavón*, type.

Aegiphila cuneata Mold. Brittonia 1: 185. 1932; 292.

Branchlets subterete, rugose-striate, early shortly pilose; petioles stout, 1–9 mm. long, long-setose or hirsute as the leaves, these typically sparsely or glabrate above, rather densely on nerves beneath,

and the slender peduncles (2–9 cm. long), filiform pedicels (5–10 mm. long), linear bractlets (to 17 mm. long) and calyces, these with 4 subfiliform-caudate teeth; leaves elliptic-obovate, shortly acuminate, narrowed to the stout petiole, mostly about 1.5–2 dm. long, 5.8 cm. wide, chartaceous, slightly sinuate-margined; secondary nerves 8–12 pairs; inflorescence axillary and terminal, the cymes to about 1 dm. long, 3–5 cm. wide, dense, usually subumbellate with 2 foliaceous bracts at base; calyx campanulate, about 5 mm. long, marginally 4-angled, the filiform tipped teeth 4–6 mm. long; corolla tube about 6.5 mm. long, pilose within, the 5 oblong-lingulate lobes 5 mm. long; stamens 5; ovary puberulent, 4-celled.—Indument spreading or lax, densest on peduncles. The var. *hirsutissima* Mold., Phytologia 4: 173. 1953, is well-named; trichomes of younger leaves, branchlets, peduncles 4–5 mm. long. Shrub, 9 meters tall with white flowers (Ule).

Loreto: Balsapuerto, *Killip & Smith 28379; 28386*, type. Lower Río Huallaga, (*Killip & Smith 29040*, type, var.).—Río Acre: Seringal San Francisco, *Ule 9859*.

Aegiphila elegans Mold. Brittonia 1: 186. 1932; 458.

Subterete flowering branches and compact terminal and axillary inflorescences including the 2–4-lobed cyathiform calyces densely appressed flavescent (in herb. strigose or early villous-strigose); petioles thick, somewhat curved, mostly 5–7 mm. long; leaves ovate or broadly oblong-elliptic, acutely short-acuminate, rounded at base, membranous, sparsely strigose above, more or less densely (and antrorsely) so beneath, especially on the prominent (12 or 20) lateral nerves; bracts lanceolate, to nearly 1 cm. long; panicles dense, usually shorter than 7 cm. long, peduncles to about 3.5 cm. and pedicels 1–5 mm. long; bractlets many, linear, to 1 cm. long; calyx 5.5 mm. long or somewhat longer, nearly 4.5 mm. wide, not accrescent and loosely cupulate at base of the subglobose 7 mm. thick fruit; corolla yellowish, the tube glabrous, 6.2 mm. long, the 4 lingulate lobes about 4 mm. long; stamens 4; ovary glabrous, 4-celled.—*A. spicata* (Rusby) Mold., 432, of northern Bolivia, has a terminal spiciform panicle, long-acuminate leaves, calyx subsessile, campanulate, corolla purple. A vine (Krukoff), branches subscandent, fruit orange (Asplund), that has been distributed as *Cordia pubescens* Willd.; related to *A. cordifolia* (R. & P.) Mold. (author).

Junín: Puerto Yessup, *Killip & Smith 26338*.—Loreto: Iquitos, *Killip & Smith 27055*, type. Yurimaguas, *Killip & Smith 27562; 27991*. Brazil.

Aegiphila filipes Mart. & Schauer in DC. Prodr. 11: 652. 1847; 366.

Branches and branchlets subterete, slender, weak and early minutely puberulent as the decussate petioles, these 5–7 mm. long; leaves oblong to elliptic, shortly or broadly cuneate to base, usually acuminate or abruptly acute, 8–18 cm. long, 2–7.5 cm. wide, entire to coarsely angulate-dentate, thin-chartaceous, dark green above, puberulent both sides, finally glabrous above and merely densely punctate and with few–many gland disks beneath, the 10–15 pairs of secondary nerves as the veins ordinarily obscure; axillary cymes 2–3-parted, laxly spreading, the terminal panicle 5–6 cm. long, about as wide, few-branched, puberulent or pulverulent including the corolla tube; peduncles and pedicels slender or filiform, weak, the former 1.2–5 cm. long, the latter 2–9 mm. long; bractlets few, 1–12 mm. long; calyx membranous, lax, campanulate or broadly cyathiform, about 2.5–4 mm. long, attenuate into pedicel, the rim 4-mucronulate or sinuate; corolla yellow or light green, glabrous, the tube 3–6 mm. long, the 4 linear to ovate-lingulate lobes 4–6 mm. long, obtuse; filaments 4, glabrous or puberulent, affixed below the corolla mouth; stigma branches 1.8–2.6 mm. long; ovary 4-lobed, 4-sulcate; fruiting calyx cupulate, about 6 mm. long, 9 mm. wide, the fruit 8–9 mm. long and about as thick, flattened apically, obviously lobed, 1–4 seeded.—A 3–7-meter tall shrub or slender tree with orange fruit (Krukoff); flowers light green (Asplund); a weak, low shrub or tree (to 5 meters) or subscandent (Moldenke). *Williams 3146* is not this (Moldenke); besides the following, this collector made many collections, particularly at La Victoria. F.M. Neg. 20350.

Loreto: Iquitos, *Williams 8190*. Lower Río Nanay, *Williams 533*. Caballo-cocha, *Williams 2469*. La Victoria, *Williams 2622; 2850; 2856;* also *Killip & Smith 26882; Tessmann 3705; Asplund 14111*. To Panama and Bolivia; Brazil. "Chirapa-sacha."

Aegiphila glabrata Mold. Brittonia 1: 186. 1932; 374.

Scandent, the slender fruiting branchlets glabrous or nearly except for a few trichomes persisting on the thick petioles (4–6 mm. long), peduncles (4 cm. long) and somewhat incrassate pedicels (4 mm. long); leaves oblong or nearly, entire or somewhat undulate, rounded or slightly acute at base, caudate-acuminate, 15–19 cm. long, 3.5–5.5 cm. wide, membranous or chartaceous, pale green and sublustrous both sides, abundantly and minutely glandular beneath, the mid-

nerves and slender lateral nerves (7–12 pairs) prominent beneath; inflorescence terminal, several cm. long (in fruit), the linear bractlets about 6 mm. long; calyx cupulate, apparently minutely 4-apiculate, about 5 mm. thick, twice as wide at the top and closely enclosing the oblong-cylindric red glabrous fruit, this about 1.5 cm. long, 1 cm. thick.—Probably related to *A. martinicensis* Jacq. (author); consider also *A. filipes* Mart. & Schauer. Asplund's collection from a shrub 5 meters tall, branches pendent, fruit (immature) orange-red.

Huánuco: (*Asplund 12335*).—Junín: Pichis Trail, *Killip & Smith 25503*, type.

Aegiphila glandulifera Mold. Brittonia 1: 187. 1932; 364.

Glabrous or glabrate, rarely puberulent with obtusely (rarely acutely) quadrate or subterete branchlets, the opposite mostly falcate and plicate leaves densely punctulate both sides and ordinarily with many black glandular disks along the stout midrib beneath; petioles 9–13 mm. long; leaves oblong, more or less acute or acuminate each end, 12–22 cm. long, 4.5–10 cm. wide, chartaceous, nerves 10–16 pairs, veins five; peduncled axillary cymes bracteate, bracteolate, often reduced, or many-flowered and nearly 1 dm. long, the terminal panicle sometimes with 200 or more cymes, usually dense; peduncles glabrous, to 3 cm. long; pedicels slender, 2 mm. long, more or less puberulent, the many bracts foliaceous, the bractlets linear; calyx about 1.8 mm. long, 2.3 mm. wide, lax around corolla tube, truncate or 4-apiculate; corolla yellowish, tube 7.8 mm. long, lobes 4, oblong, acute, 4–6 mm. long; anthers 4, about 1.3 mm. below mouth of tube; stigma branches 4.6 mm. long; ovary 4-celled; fruit glabrous, finally black, 8–10 mm. long, 6–9 mm. thick, the cupulate calyx 4–4.5 mm. long, 9 mm. wide, puberulent (author, but specimen not cited).—Var. *pyramidata* L. C. Rich. ex Moldenke, Phytologia 1: 203. 1937, resembles *A. laevis* (Aublet) Gmelin, 394, but has longer terminal branches, thinner leaves densely disk-glandular and lightly strigillose beneath as calyx, the branchlets and panicles densely strigillose or short-strigose; type in Paris Herbarium, with description by Richard as a species; Moldenke, l.c. 4: 432. 1953, has contrasted this variety. Small tree to 8 meters tall, with yellow or greenish flowers; it has been confused with *A. filipes* (author); Haught observed trees in Colombia as strongly aromatic, the inflorescences pendent.

Loreto: Balsapuerto, *Klug 3016*. Río Ucayali, *Tessmann 3508*. "Chirapasacha" (Klug). To Costa Rica; Brazil.

Aegiphila Haughtii Mold. Phytologia 2: 8. 1941.

Extended bracts all slender or the pedicels (these 5–8 mm. long) filiform and glabrous as all of the entirely axillary few-flowered cymes; younger branchlets, petioles (5–10 mm. long) and opposite membranous entire leaves early minutely or obscurely puberulent; leaves obovate to elliptic, entire, cuneately attenuate to base, long-acuminate, about 1–2.5 dm. long, nearly 4–8.5 cm. wide, with 10 or 20 pairs of secondary nerves, the abundant reticulation evident; cymes 5–6.5 cm. long, 3–4 cm. wide, on peduncles 3.5 cm. long; calyx cupulate, about 2.7 mm. long, truncate, entire, black in herbarium as the salver-shaped corolla, this with 5 oblong-lingulate lobes 4–5 mm. long, its slender tube twice as long.—Tree, flowers white, 8 meters tall (Schunke); type a 2-meter shrub, by Oscar Haught.

Loreto: Río Mazán, *Schunke 338*. Ecuador.

Aegiphila hirsuta Mold. Repert. Sp. Nov. 33: 127. 1933; 440.

Ex char. resembles *A. ovata* but (on the basis of a single collection) internodes 5–6 cm. long in contrast to 7.5–14.5 cm., petioles about 5 mm. long, leaves more oblong, 6.5–13.5 cm. long, 2.5–5 cm. wide, lustrous, secondary nerves 8–11 pairs, peduncles about 4 cm. long, inflorescence apparently only terminal, 11.5 cm. long, 4 cm. wide; however, the inflorescence of *A. ovata* was imperfectly known, and according to the author the type of *A. hirsuta* was far too immature to permit accurate measurements of floral parts. Type described as scandent. The var. *colombiana* Mold., Castanea 10: 44. 1945, from Putumayo near Peru is of course more widely distributed, but the tree may be referable to *A. ovata* Mold., the apparent differences certainly within the range of expected variation.

Peru (no doubt). Bolivia.

Aegiphila insignis Mold. Brittonia 1: 188. 1932; 436.

Branchlets obtusely tetragonal, the younger parts more or less densely yellowish puberulent especially toward the small terminal and axillary conspicuously foliose-bracted cymes; petioles 6–12 mm. long; leaves opposite, mostly unequally geminate, entire, oblong, abruptly and acutely acuminate, acute at base, membranous, lustrous both sides, early puberulent-strigillose on the 7–8 lateral nerves and prominently reticulate veins beneath; axillary cymes only in uppermost pair of leaves, about 5 cm. long and wide, the terminal panicle of cymes to a dm. long or longer; pedicels filiform, about

2 mm. long; bracts many, ovate, oblong or lanceolate (smaller ones), to 4.5 cm. long, 2 cm. wide, truncate to acute at base, the outer simulating an involucre, glabrous or nearly; calyx campanulate, puberulent-strigillose, about 4 mm. long, the 4 broadly ovate obtuse lobes 1 mm. long; corolla tube 14–18 mm. long, glabrous, the ovate-lingulate lobes 4 mm. long; stamens 4, 2.6 mm. below mouth; stigma branches 9 mm. long or longer; ovary glabrous, 4-celled.—Allied to *A. fluminensis* Vell. of Brazil and *A. pulcherrima* Mold. (author); the latter, in all probability, is the same.

Huánuco: Chicoplaya, *Ruiz & Pavón* (*Tafalla*), type.

Aegiphila integrifolia Jacq. ex Hook. & Jacks. in Ind. Kew. 1: 46. 1895; 337. *Callicarpa integrifolia* Jacq. Enum. Syst. Pl. 12. 1760. *C. globiflora* R. & P. Fl. Peruv. 1: 49, *pl. 77b*. 1798. *A. arborescens* (Aublet) Gmelin, Syst. Nat. 2: 259. 1791. *Manabca arborescens* Aublet, Pl. Guian. 1: 64. 1775.

Branches and branchlets acutely angled, compressed and ampliate at node, very medullose, canescently puberulent-pubescent as the decussate petioles (4–13 mm. long) and completely axillary inflorescence or this as the leaves especially on the 10–15 prominent secondaries beneath more sericeous-tomentose; leaves entire or denticulate, oblong to obovate or elliptic, attenuately decurrent, acuminate at apex, mostly 1–3 dm. long, a half to a dm. wide, somewhat lustrous above where glabrate in age, glandular-dotted beneath, the veins fine; cymes solitary, dichotomous, trifid, lobate or capitately corymbose, usually dense; peduncles 2–5 cm. long, grooved; pedicels filiform, to 5 mm. long, obsolete (female flowers), bractlets absent or few and short; calyx mostly clavate or turbinate-tubular, 5–8 mm. long, sericeous also within, acutely 4-dentate, 4-lobed or 4-parted; corolla funnelform, lobes ovate- or lanceolate-lingulate, acute, 2–4 mm. long; stamens 4, just below mouth; stigma branches about 2.5–3.5 mm. long, ovary glabrous; fruit 8 mm. long, 7 mm. thick, apically depressed, smooth, lustrous, finally orange with 2–4 ovate plano-convex seeds, the cupulate unevenly lobed calyx enclosing its base.—Sometimes 12 meters tall, trunk 3 dm. in diameter, rough gray bark, flowers white (Williams).

San Martín: Zepelacio, *Klug 3468*.—Huánuco: Chicoplaya, *Ruiz & Pavón* (type, *C. globifera*). Cuchero, *Spruce 1616*. Pampayacu, *5053*.—Junín: Puerto Yessup, *Killip & Smith 26239*.—Loreto: Río Mazán, *José Schunke 343*. Iquitos, *Klug 108*. Caballo-cocha, *Williams 2052*(?); *2328*. La Victoria, *Williams 2583; 2795*. Río Ucayali,

(*Castelnau*).—Cuzco: (*Sandeman 3676*); (*Scolnik 903*).—Puno: (*McCarroll 94; Metcalf 30667*). To Colombia, Bolivia and Trinidad. "Tabaquillo" (Williams).

Aegiphila longipetiolata Mold. Brittonia 1: 188. 1932; 417.

Similar to *A. chrysantha* but glabrate and, ex char., petioles 5–15 mm. long, leaves lanceolate or oblong, acute at base, about 7–12 cm. long, 2.5–4 cm. wide, glabrous, with about 5 pairs of secondary nerves; panicle terminal, ample (to nearly 2 dm. long), the 11–13 cymes well-peduncled; calyx about 2.5 mm. long, with 4 small teeth; corolla tube about 3.5 mm. long.—If this glabrous variant of *A. chrysantha* Hayek, in which Hayek included *Weberbauer 4667*, is correctly placed the other differences could conceivably also be within an expected range of variations for any species. Some material of *A. chrysantha* has oblong-lanceolate leaves and of course inflorescences vary in size. The types of both plants were from the same general region, "Yurimaguas."

San Martín: Moyobamba, (*Weberbauer 4667*, type).

Aegiphila membranacea Turcz. Bull. Soc. Nat. Mosc. 36, pt. 2: 219. 1863; 370.

Elongate subterete branchlets, petioles (5–10 mm. long), and peduncles (2.5–4 cm. long) at least early short-pubescent or pilose; leaves entire, oblong or oblong-lanceolate, acute at or narrowed to base (acuminate), about 1.5– nearly 2.5 dm. long, 4–6.5 cm. wide, thin-chartaceous, blackening and more or less undulate dried as the midrib and 6–10 pairs of unevenly branched slender nerves, glabrate above except for puberulent nerves, puberulent or short-pubescent and closely punctate; inflorescence a terminal panicle to at least 1.5 dm. long, the lower of the many branches often deflexed; pedicels filiform, puberulent, 4–5 mm. long; bracts few, small, the bractlets linear, to 5 mm. long; calyx 2.3–3.3 mm. long, puberulent, entire or 4-apiculate; corolla yellowish, the glabrate tube about 4 mm. long, the oblong-lingulate lobes 4.5 mm. long to nearly 2 mm. wide; stigma branches about 2 mm. long; fruiting calyx glabrate, 3–4 mm. long, 8–10 mm. wide, truncate, entire, the oblong glabrous fruit 4-seeded.—Chartaceous leaves of *A. filipes* Mart. & Schauer, which, however, never become undulate; has often been confused with *Clerodendrum* (Moldenke); to 3 meters tall, flowers greenish-white (Steyermark), fruit orange (Williams).

Loreto: Río Ucayali, *Tessmann 4666*. To Colombia, Venezuela, Surinam.

Aegiphila mollis HBK. Nov. Gen. & Sp. 2: 250, *pl. 130*. 1818; 403. *A. Mutisii* HBK. l.c. *pl. 131* and *A. salutaris* HBK. l.c. 249, fide Moldenke. *Cornutia velutina* Hayek, Bot. Jahrb. 42: 172. 1908.

Branches fuscous in age and subterete, the younger subangled and densely hirsute-lanate as the weak petioles (4–11 mm. long) and leaves, especially above, these beneath as the peduncles (1.5–5.5 mm. long), pedicels (1–3 mm. long) and usually calyces yellowish lanate; leaves entire or subdentate toward acuminate or acute tip, obovate-oblong, ovate-elliptic or elliptic, acute at base or often attenuate into petiole, 6–19 cm. long, 2–8.5 cm. wide, membranous, the lateral nerves 6–8 pairs well-defined beneath by their denser usually divergent indument; inflorescence axillary and terminal, the opposite cymes corymbose or panicled, bracted, spreading, to half as long as the subtending leaves, the thyrsoid terminal panicle to 17 cm. long, 10 cm. wide, often trichotomous, bracted and foliose at least below, the geminate bracts foliaceous, about 2 cm. long, acute both ends, sparsely lanate, the bractlets setaceous, 3–5 mm. long; calyx 2–3.3 mm. long, 3.6 mm. wide, subquadrate, lax, subtruncate, repand or 4-mucronate; corolla white to yellow, pilose or glabrate, the tube 3.7–5.3 mm. long, lobes acute, 4 mm. long, 2 mm. wide; filaments pilose; stigma branches 1–4 mm. long; calyx in fruit 4-angulate, entire, greatly accrescent, the orange fruit with 2–4 oblong seeds.—The var. *intermedia* Mold. described from Colombia is only tomentulose-puberulent and seems to be *A. peruviana;* shrub or small tree, often unpleasantly odorous, not in Peru according to Moldenke, who has suggested that all Bolivian species referred here may belong to his *A. Steinbachii*, Phytologia 2: 9. 1941, with 4-lobed calyx rim. F.M. Negs. 17568 (*Cornutia velutina*); 17588 (*A. salutaris*).

Peru (probably; cf. note above). To Panama and Bolivia?

Aegiphila Mortoni Mold. Phytologia 1: 249. 1937.

Shrub, the obtusely angled branchlets and chartaceous leaves above shortly pubescent, the leaves beneath and axillary dense cymose capitate inflorescences white tomentose; petioles 1.5 to nearly 2 cm. long, not marginal; leaves oblong or elliptic, obtuse or acute at base but not decurrent, acute, 9.5–13 cm. long, 3.3–4.4 cm. wide, densely barbellate beneath along midrib and the 8–12 secondaries (otherwise tomentose), not glanduliferous; cymes solitary, opposite, 1–2 cm. long or wide, the conspicuous linear bractlets 8–10 mm. long,

short fulvous-pubescent, often 3 at the base of the similarly pubescent obscure calyx, this 5-ribbed, shortly 5-dentate, 6–7 mm. long, 3.5–5 mm. wide; corolla tube about 4 mm. long (bud), the 5 lobes 2–3 mm. long, glabrous; stamens inserted about medially; style 2–3 mm. long, branches 2 mm. long; ovary glabrous.—About 5 meters tall with large clusters of green berries (collectors); allied by author to *A. truncata* Mold., 289, of Colombia. Meritoriously named for C. V. Morton of the United States National Herbarium.

Cuzco: Panticalla Pass, 3,600 meters, (*Cook & Gilbert 1234*, type).

Aegiphila multiflora R. & P. Fl. Peruv. 1: 50, *pl. 76*. 1798; 295. *Clerodendrum bolivianum* Britton ex Rusby, Bull. Torrey Club 27: 82. 1900, fide Moldenke.

Branches stout, 4-angulate, compressed at the granulose-tomentose enlarged nodes, the branchlets early purplish tomentose or hirsute, finally granulose-tomentose, strigillose or glabrate as the slender or stout petioles (0.5–2 cm. long) and peduncles (to 3 mm. long); leaves ovate-lanceolate or oval, shortly attenuate into petiole, rounded or abruptly acute, about 0.5–1.5 dm. long, half as wide, glabrate above, rather lanate or villous beneath especially on the 6 to 20 pairs of nerves and veins, these prominent; cymes all in axils or at nodes of preceding year, solitary, often congested, sometimes 2–3-fid; pedicels 0–3 mm. long, lanate-pilose; bractlets minute; calyx 3.6–6.2 mm. long, 4–6 mm. wide, purple pubescent or tomentose, 4-denticulate; corolla red-purple, tube 13 mm. long, puberulent only without or the ovate-lingulate obtuse lobes (at least 5 mm. long, 3.5 wide); stigma lobes 3.1 mm. long; calyx in fruit patelliform, 8 mm. wide, verruculose pubescent, the subrotund 4-angled dark purple fruits depressed both ends, with 4 osseous striate seeds.—Becoming a tree, to 7 meters tall, stems medullose but wood said to be durable and used for boats; corolla lavender; superficially resembles *Clerodendrum* (Moldenke); the flowers are dark red. Ruiz and Pavón apparently combined their Pillao and Huassahuassi collections and noted it growing near water with aspect of *Cornus*. F.M. Neg. 17587.

Huánuco: Pillao, *Ruiz & Pavón;* same department, (*Asplund 13586*).—Junín: Huassahuassi, *Ruiz & Pavón*, type.—Puno: Sandía, *Vargas 1311; 6948; 9644*. Limbani, *Metcalf 30550*. Bolivia. "Utcus."

Aegiphila ovata Mold. Brittonia 1: 189. 1932; 441.

Conspicuously hirsute, a shrub or the elongate (to 3.5 meters long or longer) branches probably more or less scandent, these subterete

and with the petioles (9–12 mm. long) most densely clothed with spreading trichomes 1–3 mm. long, these arcuate or subappressed and more or less bulbous-based on the membranous leaves, especially above where rather sparse; leaves ovate, rounded at base, acutely subcaudate-acuminate, in type 12–23 cm. long, 6 (4.5) –11.5 cm. wide, entire, ciliate (Moldenke), the slender secondary nerves about 13 pairs, prominent only beneath; inflorescence axillary (and terminal?), hirsute-villous, the few cymes opposite, subcapitate, nearly 4 cm. long, 2.3 cm. wide; peduncles about 1 cm. long, pedicels 1–2 mm. long, bractlets few, linear, to 11 mm. long; calyx campanulate, at least 4 mm. long, the ovate lobes rounded to a short apiculation; corolla tube 3.6 mm. long, lobes 2.6 mm. long, 1.5 mm. wide; stamens 4, just below the mouth, exserted; ovary glabrous, 4-lobed, 4-celled.—Simulates *A. cordata* Poeppig with cordate or subcordate shortly acuminate leaves and is apparently distinct; type described as a shrub. Moldenke, in his key, l.c. 277, describes the leaves as not ciliate.

Loreto: Puerto Bermudez, *Killip & Smith 26520*, type. Bolivia.

Aegiphila Pavoniana Mold. Brittonia 1: 190. 1932; 460.

Lanate-tomentose, the membranous leaves both sides and the axillary-terminal inflorescence, or this more villous; petioles opposite, 3–5 mm. long; leaves entire, ovate or ovate-oblong, rounded at base, acuminate, 7–12 cm. long, 4–6 cm. wide, the secondary nerves (obscure above) about 6 pairs; cymes few, axillary, densely subcapitate, 2.5 cm. long, 2 cm. across, their peduncles to 1 cm. long (terminal one 2.5–4 cm.), the terminal panicle about 7 cm. long, 4 cm. wide with 3 cymes, the lower 2 subsessile; bracts 2, foliaceous; bractlets linear, numerous, longer than the calyces, these thin, tubular-turbinate, 6.2 mm. long (Moldenke), densely pubescent, the rim 4-lobate; corolla tube narrow, 5 mm. long, oblong-lingulate lobes 3.6 mm. long; stamens 4, inserted at mouth; ovary glabrous, 4-celled. —Reminds one of some forms of *A. mollis* HBK. but its inflorescence is entirely different (author); this is more simple and less developed, perhaps an individual condition or variation but, ex char., there seems to be a single character that, if correct, may indicate a distinct species, namely, the much larger 4-lobate calyx. Moldenke, Phytologia 1: 256. 1937, has discussed a Pavón inscription (apparently) on label for this species in British Museum which reads "Huayaquil"; as he suggests, the plant may have been collected at Guayaquil (and

probably by Tafalla). A 5-meter tree, the flowers cream-colored (Haught).

Peru(?): Without data, (*Ruiz & Pavón*, type, Herb. Boissier, Geneva). Ecuador.

Aegiphila peruviana Turcz. Bull. Soc. Nat. Mosc. 36, pt. 2: 219. 1863; 368.

Branches and branchlets, petioles (4–17 mm. long), peduncles (2–6 cm. long), and pedicels (1.5–2 mm. long) all slender and at least early densely puberulent as the decussate leaves both sides and the axillary and terminal inflorescences including the campanulate or turbinate-cyathiform calyces, these membranous, about 2–3.5 mm. long, 4-apiculate; leaves lanceolate to oblong, acute or acuminate both ends, 8–15 cm. long, 2.5–4 cm. wide, membranous or chartaceous, slightly rough above in age, often with many gland-disks along midrib beneath, the 6–12 pairs of secondaries prominent; cymes solitary, 5–6 cm. long, 1–4 cm. wide, bracteolate, the terminal panicle thyrsoid or loose and spreading, 5–19 cm. long, 4–10 cm. wide; bracts few, subfoliaceous, bractlets few, linear, 2–3 mm. long; corolla tube about 2.5–3.5 mm. long, glabrate, the 4 ovate-lingulate lobes 3.1 mm. long; stamens 4; stigma branches 1–4.3 mm. long; ovary glabrous, 4-lobed; fruiting calyx 4 mm. long, twice as wide, shallowly capitate, lax around the fruit, this about 8 mm. long, 6 mm. wide, flattened at apex, 1–4-seeded.—Very variable, shrubby or scandent (Moldenke); a few of the many collections from Tarapoto and vicinity are cited; Klug observed it in forests, about 1 meter tall with cream-colored corollas. It suggests *A. filipes* Mart. & Schauer but, for one thing, the leaves seem to be firmer or softer. F.M. Neg. 24619.

San Martín: Tarapoto, *Woytkowski 35183; Spruce 4275*, type; *Williams 5383; 5479; 5588; 6291*. San Roque, *Williams 7334*. Juan Guerra, *Williams 6836*. Zepelacio, *Klug 3511*. Bolivia. "Huaca," "chirapa-sacha," "ucullucuy-sacha" (all Williams).

Aegiphila pulcherrima Mold. Brittonia 1: 191. 1932; 435.

Resembles *A. insignis* unless (ex char.) the following differences are taxonomically significant: leaves rounded at base or rarely subacute, acute or very short-acuminate at apex, midrib pilose both sides as the large veins beneath; axillary cymes to 9 cm. long, half as wide; pedicels 2–4 mm. long, nearly all subtended by oblong or ovate bractlets, often forming a pseudo-involucre and wider than the pair of bracts (at base of each panicle branch), these to 2 cm. long,

4 mm. wide; calyx obconic, lobes 1.3 mm. long; corolla tube 10.4 mm. long, lobes 7.2 mm. long; stigma branches 3.3 mm. long.—Reminds one greatly of *A. fluminensis* Vell. and *A. macrantha* Ducke (Brazilian) but a liana (Schunke) with distinctly terminal panicles, different venation and beautifully and characteristically yellow-pilose throughout (author). Characteristic features of a true species could questionably be known from a single collection; anyway, the yellow pilosity ex char. is only on the midrib as regards the upper leaf surface.

Junín: Chanchamayo Valley, *Schunke 400*, type; *443* (det. Johnston, *A. vitelliniflora* Klotzsch).

Aegiphila Smithii Mold. Brittonia 1: 191. 1932; 419.

Suggests in many respects *A. vitelliniflora*, apparent or possible differences (ex char.) being: branchlets (early), leaves beneath and panicles except the calyces canescent strigose; leaves lanceolate, 8.5–13.5 cm. long, 3–4 cm. wide, glabrous above with many glandular disks along midrib, secondaries 7–11 pairs; lower opposite cymes to 8 cm. long, half as wide; peduncles much thickened at base; calyx campanulate, herbaceous, glabrous (Moldenke), the lobes rounded; corolla tube to 3.1 mm. long, oblong-elliptic lobes about 2.3 mm. long; stamens just below mouth; ovary glabrous; calyx in fruit larger, patelliform, about 1.5 mm. long, 3.5 mm. wide, sparsely hirtellous (Moldenke), the subglobose fruit about 5 mm. long, warty and verrucose, bright orange (fresh), flattened apically, 2–4-seeded.—Remarkable because of its small calyx (also in fruit), bracteate inflorescence, distinctive leaves, small verrucose fruit; differs except in small calyx from *A. Spruceana* Mold., 416, and *A. parviflora* Mold., 328 (author). Liana with white flowers in cut-over weeds (Mexia); shrub with orange fruits (Asplund).

San Martín: Tarapoto region, *Klug 3894*.—Junín: Puerto Yessup, *Killip & Smith 26284*.—Loreto: Iquitos, *Killip & Smith 26957*, type; *Williams 1390; 3689; Mexia 6499*. Mishuyacu, *Klug 1460; 1490*. Lower Río Nanay, *Williams 680*. Also *Tessmann 3591; (Asplund 14048)*.

Aegiphila sordida Mold. Brittonia 1: 192. 1932; 299.

Branchlets medium-thick, subterete, light gray, densely spreading setose or hispid as the petioles, these stout, 7–9 mm. long; leaves decussate, entire, oblong, rather long-acuminate, cordate or subcordate at base, 22–24 cm. long, about 8 cm. wide, membranous, sparsely setose, more densely beneath, especially along the midrib and 10 or

20 pairs of secondary veins, the trichomes directed variously; inflorescences apparently axillary, glomerate, subsessile or short-peduncled, dense; fruiting calyx indurated, to 8 mm. long, 17 mm. wide, glabrate or very sparsely pilose, the rim repand; fruit oblong, apparently 1.5 cm. long, 4-seeded.—Type deplorable, leaves imperfect, only one fruit but suggests in Peru *A. cuneata* (author). Moldenke has determined two collections by Killip & Smith without, however, adding to his description. A liana with bright red fruit (Killip & Smith).

Junín: (*Killip & Smith 26715*).—Loreto: Puerto Arturo, Yurimaguas, *Williams 5054*, type. Also *Killip & Smith 27793*, fide Moldenke.

Aegiphila sufflava Mold. Brittonia 1: 193. 1932; 461.

Branchlets soon subterete, early densely ochrous or purplish puberulent to appressed pubescent as the stout petioles (8–12 mm. long), thyrsoid panicles, branches and peduncles (3.5–4.5 cm. long); leaves sometimes subopposite, oblong or oblong-ovate, cordate, rounded or subtruncate, acute or acuminate, 13 cm.–about 2 dm. long, half as wide, membranous or subcoriaceous, light green and lustrous both sides, glabrous above except midrib, puberulent-pubescent beneath, especially the 9–16 pairs of lateral nerves, these prominent as the veins both sides; inflorescence axillary and terminal, the cymes mostly a single pair about 4 cm. long, 3 cm. wide, bracted and bracteolate as the terminal panicle, this to 16 cm. long, with 11 or more cymes; lowermost bracts foliaceous, the much smaller uppermost lanceolate, the bractlets linear; calyx broadly obconic, 4.4 mm. long, 3.8 mm. wide, obscurely granular, unevenly 4-lobed, two lobes sometimes 1.8 mm. long on one side, two 1 mm. long, but not constantly, the calyx slightly apiculate; corolla glabrous, the yellowish tube 9 mm. long, the bright yellow lobes 5.4 mm. long, 2 mm. wide; stigma branches 2.8 mm. long; ovary glabrous, depressed-oblong; calyx in fruit heavy, about 7 mm. long, 1–1.5 cm. wide, rim entire, obscurely puberulent; fruit globose, 10–13 mm. thick.—Type, a tree 5 meters tall; the var. *Klugii* Mold., Phytologia 1: 295. 1938, is more densely appressed strigose, calyces to 7 mm. long, 5.5 mm. wide, and often with a round gland on each lobe. Apparently related to *A. racemosa* Vell., Brazil and northward, with scabrous leaves and other differences (author). Liana with yellowish flowers (Klug).

Loreto: Iquitos, *Killip & Smith 27439*, type; *Williams 8225; Tessmann 5155*. Florida, Río Putumayo, *Klug 2076*. La Victoria, *Williams 3015*. Mishuyacu, *Klug 2511* (var. *Klugii*).

Aegiphila triflora Mold. Repert. Sp. Nov. 37: 212. 1934.

Glabrous, including the axillary 3-flowered inflorescence; branches obtusely tetragonous, the branchlets slender; petioles 11–21 mm. long, deeply canaliculate above, strongly incrassate and enlarged toward base; leaves entire, oblong-lanceolate, shortly acuminate, cuneate to base, 9.5–19 cm. long, 3.5–6 cm. wide, firm-membranous, lustrous both sides, the 7–9 slender nerves prominent beneath, the secondary veins not at all or obscurely arcuate-confluent marginally; peduncles 2–4 cm. long, apically enlarged as the 11–19 mm. long pedicels; bractlets at base of pedicels 2, filiform, about 3 mm. long; calyx campanulate, about 6 mm. long, the 4 ovate-triangular teeth 0.5 mm. long; corolla hypocrateriform, the cylindric tube nearly 4 mm. long, the 5 oblong-obovate lobes about 4.6 mm. long, 2–6 mm. wide; stamens 4, inserted about 1.5 mm. below the throat, anthers sagittate, 1 mm. long; style 5.7 mm. long, stigma branches 0.6 mm. long, ovary 4-lobate, 4-celled.—Seems to be related to *A. cuneata* Mold. with short setose petioles and densely hirsute many-flowered inflorescences (Moldenke). Type from a tree 6 meters tall, the fruit pink (collectors).

Loreto: Santa Rosa, below Yurimaguas, *Killip & Smith 28858*, type.

Aegiphila umbraculiformis Mold. Phytologia 5: 225. 1955.

Stem unbranched, rather densely puberulent as the peduncles (about 7 cm. long), the slender cyme branches and the linear bractlets (1.5–3 mm. long); leaves crowded-verticillate, entire, obovate, attenuate to subamplexicaul base, acuminate, about 4 dm. long, 1.5–nearly 2 dm. wide, membranous, paler beneath, glabrous, the 12 or so slender lateral nerves and finely reticulate veins prominent only beneath; inflorescence terminal, capitate, cymosely branched; pedicels about 5 mm. long, sparsely puberulent; calyx campanulate, puberulent, 3 mm. wide, 2 mm. long, the 5 triangular very acute lobes about 1 mm. long; corolla unknown.—Shrub, 1–1.5 meters tall; no relationship suggested by the author!

Huánuco: Deep forest, Tingo María, *Stork & Horton 9495*, type.

Aegiphila velutinosa Mold. Brittonia 1: 194. 1932; 437.

Subterete branches, branchlets, stout petioles (about 1 cm. long), leaves beneath, panicle branches, peduncles (1–5 cm. long), pedicels (1–4 mm. long) and subulate bractlets densely velutinous tomentose; leaves oblong, acute at base, short-acuminate, 10–17 cm. long, 4–6 cm. wide, subcoriaceous or membranous, the secondary nerves 7–11

pairs rather prominent beneath; inflorescence axillary and terminal; cymes solitary, capitate, to 7.6 cm. long, 2.5 cm. wide, the narrow thyrsoid panicle about 2 dm. long, foliose; calyx campanulate, nearly 6 mm. long, 4.5 mm. wide, strigosely velutinous, deeply lobed, the 4 triangular lobes acute; corolla glabrous, the tube about 7.7 mm. long, widely ampliate, the apically rounded lobes 3.2 mm. long, 2.1 mm. wide; stamens at 2.5 mm. below the mouth; filaments pilose below; stigma branches about 1.3 mm. long, densely pubescent; ovary glabrous, subglobose.—Apparently related to *A. chrysantha* Hayek but densely velutinous-pubescent, and to *A. cordifolia* (R. & P.) Mold. (author).

Cuzco: Lucumayo Valley, (*Cook & Gilbert 1382*, type).

Aegiphila vitelliniflora Klotzsch in Walp. Repert. 4: 123. 1845; 421.

Branchlets strict, subterete; petioles opposite-decussate or approximate, 4.5 mm. long, strigillose; leaves entire, membranous, oblong or oblong-lanceolate, usually acute or subacute at base (sometimes rounded), acuminate, 7–12 cm. long, 3–5.5 cm. wide, quite glabrous and lustrous above except for strigillose midrib, sparsely strigillose or appressed pubescent beneath especially on midrib and larger veins, glandular disks few, the 6–8 pairs of slender secondaries reticulate near margins; inflorescence axillary and terminal, the solitary opposite somewhat corymbose cymes to 6.5 cm. long, 3 cm. wide, the panicle pyramidal-thyrsoid, to 1.5 dm. long, 1 dm. wide, the many pairs of cymes bracted, the peduncles to 6 cm. long, appressed pubescent; pedicels strigillose, 1–1.5 mm. long; bractlets elongate-linear; calyx turbinate or broadly campanulate, 2.6–5.2 mm. long, strigose or pilose, 4-lobed or split, the ovate acute lobes 1 mm. long; corolla yellowish or white, fleshy, the narrow tube at least 5 mm. long, pubescent only within, the 4 ovate- or elliptic-lingulate lobes about 3–4 mm. long, acute; stamens 4 (5), at 1.5–3 mm. below mouth; stigma branches 2.6–4.1 mm. long; ovary 4-lobate, glabrate; fruit oblong, obtuse, smooth, 1–4-seeded, the cupulate accrescent calyx indurated. —A 4-meter shrub that in Peru has been confused with *A. filipes* and *A. chrysantha;* it seems possible, if Moldenke's specific lines are accurate, that the Klotzsch plant is not in Peru, at least typically. *A. setiformis* Rusby, 433, of northern Bolivia, has leaves usually rounded at base, corolla said to be reddish-purple, the tube 6–7 mm. long.

Peru (cf. note above). Bolivia; Brazil.

19. AVICENNIA L.

Reference: Moldenke, Phytologia 7: 123–168, 179–232. 1960.

Shrubs or trees, the branches and branchlets strongly nodose, articulate, the leaves opposite, entire, persisting. Inflorescence determinate, cymose, spicate or congested, when axillary generally geminate. Calyx segments nearly free, the corolla tube not exserted, each flower closely subtended by 3 imbricate scaliform bractlets (involucral). Stamens 4, equal or subdidynamous. Ovary with a central subulate placenta, 4 pendent straight ovules. Fruit a tomentulose compressed capsule but juicy, somewhat fleshy, dehiscent by 2 valves and regularly developing only a single seed.—The genus is sometimes considered as constituting a family, Avicenniaceae; cf. note, under family description. The dark brown hard wood is very durable. The name recalls Ibn Sina, erudite Persian, 980–1037.

Avicennia germinans (L.) Stearn, Kew Bull. 34. 1958; 179. *Bontia germinans* L. Syst. ed. 10, 2: 1122. 1759. *A. nitida* Jacq. Enum. Pl. Carib. 25. 1760. *A. tomentosa* Jacq. Sel. Stirp. Amer. Hist. 178, *pl. 112, fig. 2.* 1763. *A. tomentosa* Jacq. var. *guayaquilensis* HBK. Nov. Gen. & Sp. 2: 284. 1818.

Branchlets and leaves above glabrous, the latter densely punctulate and beneath (at least in life) canescently and commonly compactly furfuraceous tomentulose, oblong-lanceolate to elliptic or obovate, more or less narrowed to or at base, obtuse or acute, to a dm. long, 4 cm. wide or larger; spikes usually several cm. long, the sessile white or yellow flowers mostly opposite, 1–2 cm. long; calyx segments ovate, glabrous only within, 3–5 mm. long, equaling or exceeding the glabrous corolla-tube, this with lobes to 2.5 mm. long, appressed pubescent without, tomentose within; stamens little exserted; fruit somewhat oblique, about 1–2 cm. long, slightly more than half as wide.—Stearn, l.c. 33–37, gave a helpful key to the main species of "mangrove" in the West Indies and northern South America.

Tumbez: Mangrove swamps, Río Tumbez delta, *Raimondi.* Warm American coasts to Florida and Texas.

LABIATAE Juss. Mint Family

Reference: Epling, Repert. Sp. Nov. Beih. 105: 1–93. 1938.

The familiar redolence of mint, opposite leaves on usually square stems or branches and, characteristically, bilabiate flowers constitute of course the distinctive traits of this group of plants, so rich in pleasant products, particularly the herbs supplying taste or aroma to

foods; technically, only the Boraginaceae and Verbenaceae are similar; in the former the ovule micropyle is ascending and the raphe is divaricate, in contrast to the inferior micropyle and inward raphe of the Labiatae. While the style is usually gynobasic in the mints, it is sometimes terminal as in the Verbenaceae and in such cases a combination of characters, of course, must be observed to separate the connecting family tribes (Lawrence).

This account of the Peruvian members is compiled often nearly verbatim from Carl Epling's reviews (as cited under genera) of the South American species, works commendable for conciseness, clarity, and sometimes frank presentation of specific problems, not understandable from purely morphological data. However, at the time of his publications (1935–1939) continuities of specific relationship in keys and discussions were frequently restricted to political boundaries. Fortunately, as regards this work, many Peruvian species have counterparts in adjacent areas and are earlier in publication date; also, as noted in my preface, especially as regards the Andean entities, the flora of Peru is remarkably distinctive. Most determinations were by Epling and, of course, accepted by me.

The historical classification of Bentham continued by Briquet and in our time by Epling—with customary nuances of thought prompted by new data and (or) new interpretations—is seemingly correct; Epling devised a somewhat simplified key for the genera of northern South America and for Peru (l.c. 1–2), (avoiding for convenience staminal data), from which no important deviation has seemed to me practical, even as to Peru above.

Lavender is from *Lavandula vera* DC., native to the Mediterranean, a tomentose shrub with narrow spicate bluish flowers, the included stamens free from the lower lip; the name itself recalls sachet bags and linens. Delightful mint (*Mentha* L.) is, naturally, from delicious Mintha, who was transformed by Ceres into the plant; her assuaging character, in beverage or sauce, thankfully, has not been lost even if many have forgotten her fanciful origin.

Gordon P. De Wolf, Jr., Baileya 3: 47–57. 1955, gave a key and interesting comment on the species of *Lavandula*, based on Miss D. A. Chaytor's revision, Journ. Linn. Soc. Bot. 1937. The same author has papers on *Nepeta*, l.c. 98–107. 1955, and *Origanum* and allies, l.c. 2: 57–66. 1954; also on *Mentha*, l.c. 2: 3–11. 1954.

Stamens 4, unequal, lying on lower corolla lobe.

Flowers verticillate in racemes; lower lip of subequal segments plane or nearly.....1. *Ocimum.*

Flowers axillary, capitate-cymose or paniculate; lower lip more or less saccate.

Calyx deflexed in fruit, upper tooth large; flowers axillary. 2. *Coleus.*

Calyx not or little deflexed, lobes or teeth not strongly diverse.

Nutlets thin erose-margined, concave-cymbiform. 3. *Marsypianthes.*

Nutlets angled or never thin-margined, often complanate. 4. *Hyptis.*

Stamens 4 (or 2 but anthers 2-celled, connective not filiform), straight and remote or diverging.

Fertile stamens 4; suffrutescent or if herbaceous more or less erect.

Calyx as corolla obscurely or not bilabiate; stamens somewhat exserted; herbs.....5. *Mentha.*

Calyx as corolla more or less bilabiate; stamens little or not exserted.

Calyx scarcely if at all accrescent; stamen connective deltoid.

Calyx 12-veined.....6. *Minthostachys.*

Calyx 10-veined.....7. *Satureja.*

Calyx reticulate-venose, soon accrescent; corolla tube annulate or pilose.....8. *Sphacele.*

Fertile stamens 2; prostrate herb, leaves rounded....9. *Hedeoma.*

Stamens 2, parallel-ascending under upper lip, sometimes long-exserted; anthers at least by confluence 1-celled.

Filament terminating in filiform connective of linear anther; leaves linear only in *S. rosamarinus*.....10. *Salvia.*

Filaments normal to anthers; leaves linear.....11. *Rosmarinus.*

Stamens 4, the anthers often paired under the concave or arched upper lip.

Calyx short, obscurely lobed and with a bump above. 12. *Scutellaria.*

Calyx 5- or 10-dentate.

Calyx teeth 10, spinose and recurved in fruit..13. *Marrubium.*

Calyx teeth 5, sometimes spinose and more or less recurved in age.

Flowers purple or white.

Leaves never pinnatifid.

Corolla throat ampliate; nutlets truncate..14. *Lamium.*

Corolla throat not or slightly ampliate; nutlets obscure. 15. *Stachys.*
Leaves pinnatifid.....16. *Leonurus.*
Flowers yellow or orange.....17. *Leonotis.*

1. OCIMUM L.

Sweetly scented herbs (Peru) with entire leaves, the floral reduced, bract-like, the flowers usually 6 in racemosely disposed verticils, each blossom on an erect pedicel recurved at tip, reflexed in fruit. Stamens 4, distinct, declinate on lower corolla tip, this entire, flat, scarcely longer than the 4-lobate upper. Calyx campanulate, the much larger often margined upper tooth recurved in fruit.

Basil or Sweet Basil as it is sometimes called, is esteemed internationally by cooks and gourmets.

Plants (at least in part) pubescent.
Corolla 3–5 mm. long.....*O. americanum.*
Corolla 7–8 mm. long.....*O. basilicum.*
Plants glabrous.....*O. micranthum.*

Ocimum americanum L. Amoen. Acad. 4: 276. 1755; 72.

Branches crisply pubescent; petioles to 1 cm. long; leaves oblong-elliptic, mostly obtuse, sparsely hirtellous, 1.5–3 cm. long, about half as wide; bracts persisting, 3–4 mm. long; pedicels 2–2.5 mm. long; calyx in flower 3 mm. long, in fruit 4–4.5 mm. long, upper tooth complanate, rotund, the lowest 1.5–2 mm. long, lanceolate-subulate; corolla 3.5 mm. long, upper lobes subequal, lower 1.5–2 mm. long; nutlets 1.5 mm. long.—Otherwise similar to *O. basilicum.* Illustrated, Bot. Mag. 51: *pl. 2452* (as *O. canum*).

San Martín: Tarapoto, *Williams 5399.* Warm America. "Shara masha" (Williams).

Ocimum basilicum L. Sp. Pl. 597. 1753; 72.

Branches hispidulous; petioles to 1.5 mm. long; leaves subentire, ovate-lanceolate, shortly acuminate, glabrous or sparsely pilose toward the rounded base, 3–5 cm. long; flowers in 3's, mostly deflexed in age as the ciliate bracts (4–6 mm. long); pedicels to 3 mm. long; calyx in flower campanulate, 4 mm. long, the upper tooth rounded-cordate, decurrent, the lateral ovate, obtuse, mucronate, shorter than the

pungent lower, the mature calyx hispid-ciliate, reticulate venose, the upper tooth 5 mm. across, the incurved lower 2.5 mm. long; corolla 7 or 8 mm. long, lower lobes about 4 mm. long, tube glabrous within; stamens subexserted, the upper filaments dentate-appendaged; nutlets about 2 mm. long.

Peru (no doubt). Asia; Africa and introduced to South America.

Ocimum micranthum Willd. Enum. Hort. Berol. 630. 1809; 73.

An erect glabrous divaricately branched herb sometimes a meter tall; petioles 1–2 cm. long; leaves often ovate, acuminate or acute, rounded-attenuate at base; bracts deciduous, sessile, ovate, acuminate; calyx early 2.5 mm. long (pedicels 3 mm. long), upper tooth finally 7–8 mm. long, decurrent to truncate base, lower teeth pungent, twice as long as lateral; corolla 3–4 mm. long, subequaled by stamens, these glabrous and unappendaged; nutlets about 2 mm. long.—A common weedy "Basil," but annual, with minute blue flowers; only a few collections cited.

San Martín: Tarapoto, *Woytkowski 35199*.—Junín: La Merced, *15244*.—Loreto: Ucayali, *Tessmann 3401*. Río Nanay, *Williams 482; 598*. Yurimaguas, *Williams 4942; 4994*. Warm America to Florida. "Shara-masha," "pichana-alvaca," "albaca sylvestre," "abaca."

2. COLEUS Lour.

Similar to *Ocimum* but the lower lip of the corolla longer, concave or boot-shaped and enclosing stamens and style, the filaments united.

The highly ornamental Coleus of Java is a popular foliage plant, the naturally carotinoid leaves having been modified in horticulture in almost infinite variety.

Coleus Blumei Benth. Lab. Gen. & Sp. 56. 1832.

Herb with long petioled coarsely crenate or variously lobed or parted ovate more or less acuminate blotched or colored leaves; flowers small, blue or pale in narrow or racemose panicles or spike-like racemes.—Apparently often established as an escape from gardens, a few collections cited. Founded on cultivated plants, the application of the name is open to question.

Loreto: Iquitos, *Williams 8199; 8200; Klug 1427; 617*. Yurimaguas, *Williams 4073*. Leticia, *Williams 3035*.—Cuzco: Prov. Convención, *Vargas 938*. Java.

3. MARSYPIANTHES Mart.

Like *Hyptis* Jacq. but unique in the concave cymbiform nutlets with fimbriate or lacerate membranous margins; a few-stemmed procumbent-ascending to erect herb, usually viscid-villous, rarely glabrous, the flowers mostly or ordinarily in lax heads in the upper leaf-axils.—The name, according to Epling, Repert. Sp. Nov. Beih. 85. 184. 1936, was actually that of Bentham, who in courtesy accredited it to Martius, the latter in herbaria having suggested another name; it could be included in *Hyptis*, but, once encountered, it is recognizable and has a pleasant name. Epling, Brittonia 12: 142–143. 1960, with a good plate, emphasized the distinctively elongate gynobase (in contrast to *Hyptis*) and the unique thin inflated margins of the nutlet wall by which it is attached laterally to the gynobase column.

Marsypianthes Chamaedrys (Vahl) Ktze. Rev. Gen. 2: 524. 1891; 74. *Clinopodium Chamaedrys* Vahl, Symb. 3: 77. 1794. *Hyptis Chamaedrys* Willd. Sp. Pl. 3: 85. 1800.

Petioles 1–1.5 cm. long; leaves crenate-serrate, ovate, narrowed to subcordate at base, obtuse, usually 2–6 cm. long, 1–3 cm. wide, sparsely villous; heads hemispheric, subsessile or peduncles to 3 cm. long; bracts linear-lanceolate, rarely ovate (var. *bracteosa* Benth.); calyx in flower 4–5 mm. long, teeth deltoid-ovate, acuminate, 1.5–4 mm. long, tube in fruit broadly turbinate, 3–5 mm. long, the finally spreading teeth villous or lanate (var. *eriocephala* Benth.); corolla tube 4–6 mm. long; nutlets 1.5 mm. long.—Rarely perennial, blue flowers insignificant; seeds resemble those of *Allionia incarnata* L. (Svenson, Amer. Journ. Bot. 33: 481. 1946). Illustrated (as *M. hyptoides* Mart.), Hook. Icones, 5: *pl. 457;* Epling, l.c. 142–143 (gynobase).

Tumbez: Hacienda La Chosa, *Weberbauer 7711.*—Piura: Amotape Hills, (*Haught & Svenson 11533*).—San Martín: Zepelacio, *Klug 3320.* Lamas, *Williams 6462.*—Loreto: Iquitos, *Mexia 6491; Killip & Smith 26904.* Río Nanay, *Williams 287; 437.* Caballo-cocha, *Williams 2202.*—Cuzco: Near Potocus, *Weberbauer 7949.* Hacienda Potrero, *Vargas 2578.* Most of tropical America, especially near the sea.

4. HYPTIS Jacq.

Epling, Rev. Mus. La Plata Bot. 7: 153–497. 1949.

Sometimes trees but commonly half-shrubs, less frequently small annuals. Flowers often capitate, now and then in cymules or verti-

cils, rarely opposite in diffuse panicles. Calyx ordinarily 10-veined, not infrequently recurving or deflexed at tip; teeth various, not or little diverse or the upper usually larger. Corolla distinctive by the strongly saccate middle lobe of the lower lip on which rest the 4 didymous stamens. Nutlets usually complanate, commonly angled, rarely margined or exceptionally, with inclusion of *Marsypianthes* Mart., thin- and lacerate-margined, a logical and natural disposition in view of Epling's inclusion of *Perilomia* HBK. in *Scutellaria* L., the former marked by lacerate angles.

Epling's monograph has come to notice after my compilation, made much earlier from his original studies, was in press. Thanks are due to Philip Munz, Director, Rancho Santa Ana Botanic Garden, for obtaining the loan of Miss Mathias' copy of Epling's work, courtesy (in her absence) of Peter Raven. It has been possible to include the more important new data but the author's sectional key has seemed to be too detailed and too burdened, sometimes, with exceptions to be useful in this floristic work. The second or final numbers after species names refer to his authoritative monograph, which is especially noteworthy for maps showing sectional distributions.

The following key is devised, at least in part, expediently; some species may not be found readily, for instance, *H. carpinifolia, H. eriocephala, H. pectinata, H. pilosa, H. suaveolens.*

Flowers in small cymules, sometimes capitulate but at least in part pedicellate or the more or less capitate cymules spicate or (and) in ample panicles.

Calyx teeth ovate or subulate; cymes or heads many, in usually ample, often spreading panicles.

Heads 4–6 mm. thick, many; calyces subsessile, oblique, 1–1.5 mm. long.....*H. odorata.*

Heads open, the pedicellate calyces 5–6 (8) mm. long.

Corolla tube 7–8 mm. long; nutlets small.....*H. Tafallae.*

Corolla tube 10–11 mm. long; nutlets 4 mm. long..*H. arborea.*

Calyx teeth more or less setaceous (unless *H. carpinifolia*), often rigid.

Calyx rarely 5 mm. long, or tubular; cymules mostly or all in panicles or spicate; pedicels obsolete or short.

Bracts small or linear; cymules rarely in part or mostly subsessile; section *Mesosphaerica.*

Cymules sessile in spikes.....*H. spicigera.*

Cymules subsessile or peduncled or furcate.

Cymules furcate, subsessile.....*H. pectinata.*

Cymules not furcate, peduncled.

Peduncles –3 cm. long, villous as calyces.

H. sidaefolia.

Peduncles –2 cm. long, glandular, glabrate.

H. chachapoyensis.

Bracts relatively broad, rather involucrate; cymules sessile or subsessile; section *Polydesmia.*

Bracts 3–4, calyces finally 4–6 mm. long.....*H. mutabilis.*

Bracts 4–6, calyces 6–8 mm. long.....*H. colombiana.*

Calyx funnelform, pedicellate, soon longer than 5 mm.; cymules somewhat foliose bracted.

Flowers few; annual; section *Mesosphaerica*....*H. suaveolens.*

Flowers many; shrubby; section *Polydesmia*..*H. carpinifolia.*

Flowers capitate, the dense heads usually thicker than 1 cm., few or remote, often spicate or axillary, especially if rather small.

Calyx teeth ovate, chartaceous; section *Cephalotes*, sens. lat. except as indicated.

Leaves truncate or subcordate at subsessile base.

Leaves 3–6 cm. long.....*H. Parkeri.*

Leaves 6–12 cm. long.....*H. pachycephala.*

Leaves more or less narrowed to base.

Peduncles 1–2 cm. long.....*H. lacustris.*

Peduncles to 8 mm. long.....*H. obtusiflora.*

Calyx teeth setaceous (subulate, *H. carpinifolia*).

Heads sessile or subsessile (peduncles less than 1 cm. long).

Calyx teeth strongly uncinate.....*H. uncinata.*

Calyx teeth obscurely or not uncinate.

Calyx teeth rigid, acute.....*H. lutescens.*

Calyx teeth lax, setaceous.....*H. brevipes.*

Heads (at least many or finally) well-peduncled or panicled.

Plants strictly erect, characteristically, at least in age; cf. *H. obtusata.*

Heads axillary or few.

Leaves lanceolate.....*H. savannarum.*

Leaves ovate.

Calyx tube straight.
Leaves tomentose beneath; section *Mesosphaerica*.
H. eriocephala, H. pilosa.
Leaves sparsely hirsute.....*H. capitata.*
Calyx tube curved.....*H. recurvata.*
Heads in panicled spikes; section *Polydesmia*.
H. carpinifolia.
Plants decumbent-ascending-erect; various sections.
Stems villous; section *Mesosphaerica*.
Leaves rounded, crenate..*H. marrubiifolia, H. obtusata.*
Leaves acute or subacute, serrate.....*H. elongata.*
Stems glabrate or short pubescent.
Leaves sparsely pubescent.....*H. atrorubens.*
Leaves hirsutulous.....*H. lantanaefolia.*

Hyptis arborea Benth. in DC. Prodr. 12: 132. 1848; 212.

Pyramidal tree said to attain 15 meters with a trunk diameter of 1 dm., the rugose bark 4 or 5 mm. thick; branches asperous with furcate trichomes; petioles 1–3 cm. long, the mature leaves about 1–2 dm. long, 3.5–7 cm. wide, usually elliptic but those of the inflorescence oval or obovate and reduced, all equally narrowed, obscurely crenulate, early scabrous above, densely tomentose beneath where reddish dry; flowers in dichotomous cymules subtended by linear or elliptic bracts 4–5 mm. long; leafy-based peduncles 1.5–4 cm. long; calyx 5–7 mm. long in age, finely pubescent, the throat somewhat obscure, the teeth deltoid acuminate, 2–2.5 mm. long; corolla blue-purple, the tube 10–11 mm. long; nutlets 4 mm. long, margined.—This species belongs to one of the most primitive sections—*Buddleoides* (Benth.) Epling—of the genus so far as this can be determined by its weedy habit, its non-capitate inflorescence and its relatively unspecialized calyces; the large marginate nutlets suggest also a possible derivation from a more fleshy nutlet found in some Verbenaceae (Epling and Mathias, Brittonia, 8: 297. 1957).

Junín: Huacapistana, (*Ferreyra 3588*).—Cuzco: Machu-picchu, (*Ferreyra 2702*). Roraima highlands to Colombia and Bolivia.

Hyptis atrorubens Poit. Ann. Mus. Paris 7: 466, *pl. 27, fig. 3.* 1806; 89, 108; 480. *H. tenella* Briq. & Spruce, Ann. Cons. Jard. Bot. Genève 2: 223. 1898, fide Epling.

Rooting at the creeping purplish base, the ascending elongating stems pilose, the petioled leaves hispidulous above, glabrous or pilose beneath, crenate, ovate, rounded-cuneate at base, about 2.5 cm. long; heads on peduncles to 2.5 cm. long, globose, in fruit about 12 mm. across, rubescent, the broadly ovate obtuse membranous venose outer bracts about as long, the inner subulate-acuminate; calyx tubular, early 4 mm. long, membranous, truncate, ciliate between the little shorter subulate teeth; corolla white, rose-dotted; filaments pubescent below; nutlets 1 mm. long.—Section *Pusillae* Epling 477. F.M. Neg. 17800 (*H. tenella*).

San Martín: Tarapoto, *Spruce 4007* (type, *H. tenella*). Warm America.

Hyptis brevipes Poit. Ann. Mus. Paris 7: 465. 1806; 107; Epling, Repert. Sp. Nov. Beih. 105: 124. 1937; 443.

Slender erect quadrate-sulcate stemmed annual sometimes several dm. tall, the upper stem and branches on the angles appressed hirsute, the more or less ovate or elliptic-lanceolate unevenly serrate leaves hispidulose to glabrate or beneath laxly hirsute-villous, narrowed to obscurely margined petiole, acute, 5–6 cm. long, about half as wide, rarely larger; peduncles a few mm. to 1.5 cm. long; heads dense, usually about 1 cm. across, the linear-lanceolate ciliate bracts 4–6 mm. long, finally reflexed, the inner subulate; calyx 2.5–3.5 mm. long, sparsely hispidulous within, the setaceous teeth as long as tube or nearly, the corolla scarcely exserted; nutlets hardly 1 mm. long. Section *Cephalohyptis* Benth., 417.

Huánuco: Santa María, *Allard 22490* (det. Lyman Smith).—Loreto: Caballo-cocha, *Williams 2292*. To Paraguay and the Guianas.

Hyptis capitata Jacq. Coll. 1: 102. 1786; 106; Epling, l.c. 105: 133. 1937; 470.

Perennial herb, the obtusely quadrate stems and peduncles, these 2.5–7 cm. long, glabrate, or early finely appressed hirtellous; petioles 1–3 cm. long; leaves ovate, sometimes broadly, subrounded to the more or less attenuate base, obtuse or acute, coarsely and irregularly serrate, at most about 1 dm. long, half as wide, ordinarily much smaller, minutely and sparsely hispidulous or rather densely on the veins beneath, finally nearly glabrous; mature heads 2–2.5 cm. in diameter, the at first rather conspicuous bracts 5–7 mm. long; calyx tube sparsely or scarcely villosulous, 1.5 mm. long, in fruit 8–10 mm.

long, the linear-subulate teeth 1.5 mm. long, pulverulent; corolla nearly white, the tube 2.5–3 mm. long; nutlets 1.3 mm. long.—The similar *H. florida* Benth. Bot. Voy. Sulph. 6: 150. 1846, Guayaquil, has bracts to 1.5 cm. long, lanceolate calyx teeth with rigid point 3 mm. long. Section *Cephalohyptis* Benth. Williams specimens determined by Standley.

Loreto: Yurimaguas, *Poeppig; Williams 3973; 3954; 4991.* Río Nanay, *Williams 670.* Iquitos, *Williams 3583; 7970.* To Colombia and Trinidad.

Hyptis carpinifolia Benth. Lab. Gen. & Sp. 115. 1833; 117; 82; 305.

Shrub sometimes 2 meters tall or taller, the terete branches smooth, the branchlets glandular villous, internodes 1–3 cm. long; petioles sometimes 1–2 mm. long; leaves oblong-ovate to rounded, narrowed to the rounded or subcordate base, ordinarily obtuse, mostly 2–5 cm. long, 1.5–4 cm. wide, coriaceous, glabrate above, villous tomentulose beneath, the beautifully reticulate veins there prominent, the margin acutely serrate; flowers many in dense verticils, the submembranous lanceolate bracts acuminate, 7–10 mm. long, the glomerules in more or less interrupted spikes 3–10 cm. long; calyx about 4 mm. long, in fruit 5.5–6 mm. long, teeth 2 mm. long equaling the puberulent tubes, the truncate throat erectly hispid; corolla tube 6–8 mm. long; nutlets 1.5 mm. long, abruptly apiculate.—Apparently not found in recent times in Peru; the Haenke collection was probably from Bolivia. It is a 2–3-meter shrub with veiny subcordate sessile leaves and dense spicate glomerules of purple flowers; aromatic as rosemary. Section *Polydesmia* Benth., 292.

Peru(?): Without locality, *Haenke.* Bolivia to Brazil.

Hyptis chachapoyensis Briq. Ann. Cons. Jard. Bot. Genève 2: 204. 1898; 80; 280. *H. polyantha* Poit. var. *longiflora* Benth. in DC. Prodr. 12: 124. 1848.

Similar to *H. sidaefolia;* stems sparsely glandular villous with long trichomes; leaves ovate, obtuse, 4–7 cm. long, 2–4 cm. wide, simply serrate; peduncles 1–2 cm. long, glandular, the panicle very slender; calyx nearly glabrous, the teeth 0.7–0.8 mm. long, the tube in fruit 4–4.5 mm. long, corolla tube 6 mm. long.—Bentham noted his variety as possibly a distinct species, the less pubescent calyx exceeded by the corolla tube. Name has been written by typographical error,

chacapoyensis. F.M. Neg. 28994. Section *Mesosphaerica* Benth., 252.

Amazonas: Chachapoyas, *Mathews 3151*, type.

Hyptis colombiana Epling, Repert. Sp. Nov. Beih. 85: 257. 1936; 82; 315.

Rather coarse perennial, often more or less ligneous toward base, sometimes a meter tall, the upper stem or branchlets early lightly pubescent, the internodes 3–8 cm. long; petioles 1–3 cm. long; leaves crenate-serrate (or in Peru irregularly or coarsely serrate), ovate, rounded-cuneate at base, more or less acuminate, often 3–7 cm. long, 2–4 cm. wide or wider, scabrous above, somewhat villosulous beneath, the reticulation not very prominent; verticils approximate in spikes, the purplish ovate lanceolate rather rigid bracts glabrate, 5–8 mm. long, 1.5–2.5 mm. wide, apiculate; calyx 2.5–3 mm. long, the teeth setaceous, 1–1.5 mm. long, the glabrous or nearly glabrous tube 6–8 mm. long; corolla purplish, the tube 4–6 mm. long; nutlets at least 1 mm. long.—Leaves dark green above, canescent beneath, the deep lavender corolla white-spotted basally within (Camp); perhaps the Haenke specimen of *H. carpinifolia* is this species, if distinct. The Peruvian collection was originally referred by the author to the similar *H. mutabilis* (L. C. Rich.) Briq., var. *polystachya* (HBK.) Briq. Section *Polydesmia* Benth., 292.

Huánuco: Piedra Grande near Prov. San Domingo, *3685* (det. Epling). To Colombia; Venezuela.

Hyptis elongata Benth. Lab. Gen. & Sp. 88. 1833; 93; 85; 325.

Suffrutescent, the ascending stems finally to a meter high, the older with exfoliating bark, the striate obscurely quadrate younger sublanate villous as the petioles (5–15 mm. long), peduncles (5–8 cm. long), and leaves both sides; leaves somewhat rhombic-ovate or obovate, shortly narrowed at base, acute, serrate, mostly 3–5 cm. long, 1–1.5 cm. wide; heads solitary in the upper axils, finally about 2 cm. in diameter; calyx densely lanate, tube 2–2.5 mm. long, in fruit 7 mm. long and strongly flexuose medially, the linear teeth 3.5 mm. long; corolla narrowly tubular, to 5 mm. long; style branches linear, obtuse, 0.3 mm. long.—Section *Leucocephala* Epl. 321. F.M. Neg. 17736.

Lima: Tongos, *Ruiz & Pavón; (Dombey)* type. Puruchucu, *Mathews 583*. Near Puente de Verrugas, *Weberbauer 5213*. Dry wash, Eulalia, *Goodspeed 35145* (det. Weberbauer); *Goodspeed & Stork 11479*. Prov. Huarochirí, *Goodspeed 33120*.

Hyptis eriocephala Benth. in DC. Prodr. 12: 124. 1848; 80; 282.

Perennial herb, the branches densely spreading hirsute with sulcate stems often densely pubescent as the broadly ovate leaves beneath, these white-tomentose, the veins hirsute as the green upper surfaces, cordate at base, obtuse or subacute, irregularly serrate, often 2.5–5 cm. long, 2–4 cm. wide; petioles pilose, 4–8 mm. long; cymules often binate or ternate, hemispheric, purplish, 1.5 cm. in diameter, the linear villous bracts 4–6 mm. long; peduncles 2–3 cm. long, usually racemose in the axils of the reduced upper leaves; calyx 6 mm. long, the villous tube in fruit 3.5–4 mm. long, the rigid subulate teeth mostly 1–1.5 mm. long; corolla tube 6 mm. long; nutlets 2 mm. long.—Differs from *H. sidaefolia* (L'Hér.) Briq. in the somewhat larger calyx teeth, more incanous leaves, more densely pilose stems, all variable characters (Epling). The West specimen a meter high, ligneous below, flowers pale rosy lilac; the stem indument is short. Section *Mesosphaerica* Benth., 252.

Amazonas: Chachapoyas, *Mathews 1530*, type.—Piura: Huancabamba, (*N. Angulo 2122*).—La Libertad: In limestone rocks, near Huamachuco, 3,300 meters, *West 8091*. Prov. Otuzco, 3,100 meters, (*López 1440*). Lomas, Prov. Trujillo, (*Angulo 1467*), probably a glabrate aspect. The species may be found to include other described taxa, as *H. Kuntziana* Briq. (Epling). Bolivia.

Hyptis lacustris St. Hil. ex Benth. Lab. Gen. & Sp. 107. 1833; 108; 87; 448.

Similar to *H. obtusiflora;* lower leaves ovate, shortly petioled, the elliptic-lanceolate upper sessile, 5–10 cm. long, 1–2 cm. wide, puberulent only beneath; peduncles hirtellous, 1–2 cm. long, the globose head 12–15 mm. in diameter; calyx glabrous, turbinate, the lanceolate teeth subequaling the tube, this in fruit 4 mm. long, the subobtuse teeth 1.5 mm. long, all firm-membranous; corolla tube 2 mm. long, nutlets 1.1 mm. long.—The Brazilian plant, according to DeCandolle, is glabrous. Section *Cephalohyptis* Benth., 417.

Loreto: Mishuyacu, *Klug 536* (det. Epling). Brazil.

Hyptis lantanaefolia Poit. Ann. Mus. Paris 7: 468, *pl. 29, fig. 1.* 1806; 110; 88; 459.

Habit of the similar *H. atrorubens* but the stems and leaves often shortly and more sparsely hirsute, leaves nearly sessile, usually ovate or ovate-elliptic, narrowed or rounded at base, obtuse, crenate-ser-

rate, ordinarily 2–3 cm. long, about a third as broad; mature heads 12–20 mm. in diameter, the ovate or obovate bracts 5–8 mm. long, often serrate; peduncles 2–7 cm. long, calyx pilose at base, 1.5–2.5 mm. long, finally 4–4.5 mm. long, the puberulent or glabrate subulate teeth 1.5–2.5 mm. long, nutlets 1.2 mm. long, ovate.—Sometimes prostrate-ascending and rooting below, the calyx often as corolla white and purple. Williams collections determined by Standley. Section *Cephalohyptis* Benth., 417.

Cajamarca: Río Tabaconas, *Weberbauer 6261.*—San Martín: Lamas, *Williams 6361; 6448.* San Roque, *Williams 7297.* Zepelacio, *Klug 3256.*—Huánuco: Pampayacu, *Poeppig 1404.* Hacienda Villcabamba, Río Chinchao, *5004; Ruiz & Pavón.* Sesuya, *Mathews 3143.*—Junín: Chanchamayo Valley, *Schunke 1408; 1409; 1535.*—Ayacucho: Aína, *Killip & Smith 23185.*—Cuzco: Marcapata Valley, *Weberbauer 7826.*—Puno: Near Pajonal, Limbani area, *Metcalf 30618.* Tropical America. "Boton quina" (Williams).

Hyptis lutescens Pohl ex Benth. Lab. Gen. & Sp. 109. 1833; 114; 86; 389. *H. affinis* Benth. l.c. fide Epling.

Shrub, the leafy branches above densely villous, the leaves villous tomentose beneath; petioles about 1 cm. long; leaves oblong-elliptic or elliptic, narrowed to base, rounded or obtuse at apex, to about 1 dm. long, half as wide, closely crenulate; peduncles forming a narrow panicle in the axils of the reduced upper leaves, 2–8 mm. long, the glomerules frequently approximate; bracts ovate-lanceolate, acute, 6–9 mm. long; calyx tube 2–3 mm. long, equaled by the rigid acute teeth; corolla tube 4–5 mm. long; nutlets apically hirtellous, 1.5 mm. long.—Type of *H. affinis* labelled as by the artist Tafalla, the heads smaller, peduncles 6–12 mm. long, "clinopodium sp. ined." Chinchao. Section *Xylodontes* Epl., 383 (*Cephalohyptis*, subsection, fide Bentham). F.M. Negs. 8296 (*Poeppig*); 28991 (*H. affinis*).

San Martín: Lamas, *Mathews 1531.*—Huánuco: Río Chinchao, *4984; Ruiz & Pavón* (type, *H. affinis*).—Junín: Chanchamayo Valley, *Schunke 1581.* Without locality, *Poeppig 1021.* Bolivia; Brazil.

Hyptis marrubiifolia Epl. & Math. Brittonia 8: 299. 1957.

Perennial herb apparently 3–4 dm. tall the ascending simple stems white tomentose as leaves both sides with branched trichomes; leaves subsessile, 2–3 cm. long, rounded-ovate, crenulate; glomerules hemispheric, 2 cm. in diameter, branched-villous; peduncles 2.5–3.5 cm. long in the leaf axils, apparently nearly to base of stems; tube of

mature calyx 3.5 mm. long, the slender teeth 2 mm. long; corolla not seen.—Section *Mesosphaerica-Eriocephalae.*

Amazonas: On thin sandstone 10 km. east of Balsas, (*Evinger 508*, type, U. S. Nat. Herb.).

Hyptis mutabilis (Rich.) Briq. Bull. Herb. Boiss. sér. 4: 788. 1896; 121; 83; 317. *Nepeta mutabilis* Rich. Act. Soc. Hist. Nat. Paris 1: 110. 1792.

Annual herb, probably sometimes enduring, erect, branched, glabrous to villous, the quadrate stems scabrous on the acute angles, the medial internodes about 1 dm. long, petioles 1–4 dm. long; leaves mostly rhomboid-ovate or ovate, narrowed to a rounded or subcuneate base or rarely subtruncate or subcordate, ordinarily shortly acuminate, irregularly crenate-serrate, glabrous to hirtellous above, hirtellous to canescent tomentose beneath or exceptionally glabrous; flowers few to many in rather dense verticils, the elliptic ovate bracts ordinarily ciliate, apiculate, 3–4 mm. long, the slender peduncles 1–4 mm. long, the glomerules often 1–2 cm. distant or even more laxly distributed; calyx 1.5–2 mm. long, generally villosulous at base, the setaceous to subulate teeth 0.8–1.2 mm. long, the tube in fruit often 4 (–6) mm. long, but rarely longer than the diameter; corolla commonly bluish-purple, 2–3 mm. long; nutlets oblong, 1–1.2 mm. long. —*Mathews 1526*, no data, fide DC. Corolla noted as white and lavender, purple or violet; becomes a branched herb, a meter or two tall. Williams collections determined by Standley. Variable vegetatively and in size of calyx; these states include var. *spicata* (Poit.) Briq., var. *canescens* (HBK.) Briq., var. *polystachya* (HBK.) Briq. and var. *Pavoniana* Briq., the last, *H. canescens* var. *arvensis* Benth. and perhaps var. *canescens* the most distinctive but the upper leaves cuneate-based and the panicles more crowded. Most of the specimens cited were determined by Epling or Standley. Section *Polydesmia* Benth., 292. F.M. Negs. 29012 (var.); 32991 (var. *Pavoniana*).

San Martín: Juanjuí, *Klug 4189*. Tarapoto, *Williams 5402*. San Roque, *Williams 7296*. Zepelacio, *Klug 3516*.—Huánuco: Chinchao, *Ruiz & Pavón*. Pozuzo, *4559*. Piedra Grande, *3697*.—Junín: Chanchamayo Valley, *Schunke 1495*. La Merced, *Killip & Smith 23800*. —Loreto: Río Itaya, *Williams 49; 106; 141*. Yurimaguas, *Williams 3817; 4214; 4759; 7852*. Iquitos, *Williams 1304; 1409; 7969*.—Ayacucho: Above Aína, *Weberbauer 5624*.—Apurímac: Abancay, *Vargas* 402.—Cuzco: Echarate, *Goodspeed Exped. 10473*. Machu-picchu,

Vargas 2093.—Puno: Limbani, *Metcalf 30569; 30579.* Warm America. "Obeja-micuna."

Hyptis obtusata Benth. Pl. Hartw. 241. 1846; 125; 81; 283.

Shrub, in age the slender obtusely quadrate flowering branches rather densely short-villous, the internodes 1–8 cm. long; upper petioles about 5 mm. long; leaves closely crenulate, rounded-ovate, subcordate at base, rounded or subacute at apex, mostly 1.5–2.5 cm. long, 1–1.5 cm. wide, or the lower proportionately larger, hirsutulous above, canescently tomentose beneath, the venation prominent, even rugulose above; cymules hemispheric, branched, often binate, the peduncles 1–2 cm. long, in the upper leaf axils or on short branchlets with much reduced leaves; bracts linear, 2.5–3 mm. long; calyx 3 mm. long, villous, the throat pubescence obscure, the setaceous teeth 1–1.5 mm. long, the tubular subcampanulate tube finally 3.5 mm. long, the corolla tube 4–4.5 mm. long; nutlets 1.5 mm. long.—To a meter tall, calyx purplish, corolla lavender (Stork & Horton). Section *Mesosphaerica* Benth., 252.

Cajamarca: Chota, *Raimondi; Stork & Horton 10047.* Cutervo, *Jelski 121.*—Amazonas: Chachapoyas, *Mathews 147; Williams 7568.*—Huánuco: Casapi, *Mathews 1529.* To Colombia.

Hyptis obtusiflora Presl ex Benth. Lab. Gen. & Sp. 107. 1833; 115; 87; 449.

Strict, erect or suberect, sometimes prostrate (Marin), or a meter tall or taller, the obtusely quadrate stems appressed hirsute-villous; leaves acutely serrate, oblong or ovate-elliptic, narrowed, the short (–1 cm.) petiole acute or subobtuse, subcoriaceous, sparsely villous or above glabrate, ordinarily 7–10 cm. long, 2–4 cm. wide; peduncles stout, rarely 1 cm. long, only in the upper axils, the finally globose heads 3–8 mm. across, the ovate-lanceolate bracts 3–4 mm. long; calyx 1.2 mm. long, in fruit 1.5 mm. long, the obtuse lanceolate teeth 0.8 mm. long, the three posterior larger; corolla tube 2 mm. long; nutlets obovate, apically hispidulous, scarcely 1 mm. long.—Flowers white. Section *Cephalohyptis* Benth., 417. F.M. Neg. 8295.

San Martín: San Roque, *Williams 7371.* Zepelacio, *Klug 3480.*—Huánuco: Cuchero, *Poeppig 1320.* Near Huánuco, *Haenke,* type. Chinchao, *Ruiz & Pavón.*—Junín: Pariahuanca near Tarma, *Mathews 1214.*—Cuzco: Valle Cosnipatu, (*Woytkowski 133; 1052*). Quispicanchi, (*Marin 1552*).—Puno: San Gován, *Lechler 2448.* Bolivia to Colombia. "Boton quina" (Williams).

Hyptis odorata Benth. Lab. Gen. & Sp. 81. 1833; 84; 263; 319.

Shrub or small tree with the habit of *Buddleia* (Epling), distinctive by the almost innumerable small globose flowering heads borne in lax panicles often several dm. across; branches reddish, tomentulose, obscurely quadrate, the internodes much shorter than the leaves; petioles 5–10 mm. long; leaves oblong-lanceolate, shortly narrowed at base, acute, serrate, 8–14 cm. long, 2–4 cm. wide, glabrous above, usually cinereous-tomentulose beneath, the nerves and veins rather prominent; peduncles to 1.5 cm. long, 4–6 mm. in diameter, the bracts 1 mm. long; calyx 1.2–1.5 mm. long, campanulate, canescent without, hispidulous within, in fruit 3 mm. long, deflexed, recurved at tip; corolla violet or roseate, 3 mm. long, nutlets oblong elliptic, narrowed and mucronate apically, smooth, 1.2 mm. long.—Suffrutescent, to 3 meters tall, with erect to lax or drooping panicles of lavender or old rose flowers. Section *Myriocephala* Benth., 319. F.M. Neg. 17769.

San Martín: Zepelacio, *Klug 3714*. Moyobamba, *Mathews 1523; 9364*. Tarapoto, *Mathews 4027; Spruce 4027*. Pongo de Cainarachi, *Ule 6405; 6878; Klug 2723*. Vitoc, *Soukup 2444*.—Huánuco: Pozuzo, *4766*. Chinchao, *Ruiz & Pavón*, type. Cuchero, *Poeppig 1022*. Puente Durand, *Stork & Horton 9433; Mexia 8148*.—Loreto: Pumayacu, *Klug 3143*. Boqueron Padre Abad, *Woytkowski 34347*.—Cuzco: Colpani, (*Cook & Gilbert 1053*). Quellomayo, 1,300 meters, *West 8014*. Oropeza, (*Herrera 2612*).—Puno: San Gován, *Lechler 2414*. Bolivia. "Mapa-rosa" (Mexia).

Hyptis pachycephala Epl. Repert. Sp. Nov. Beih. 85: 314. 1937; 88; 452.

Herb, the stems villous on the upper internodes, these 3–6 cm. long; petioles 3–4 mm. long; leaves subserrate, elliptic-lanceolate, attenuate below the middle to base where abruptly rounded, acute, to 1 dm. long or longer, 2.5–4 cm. wide, nearly glabrous but slightly scabrous above and hirtellous on the veins beneath; peduncles in the upper axils, villous, 1–3.5 cm. long, the heads in fruit globose, 10–12 mm. in diameter, the elliptic bracts reflexed; calyx in fruit 5 mm. long, glabrous except for some sessile glands, the broadly deltoid teeth obtuse, scarcely 1 mm. long, corolla tube 2.5 mm. long; nutlet truncate, 1.1 mm. long.—May prove to be a large-leaved form of *H. Parkeri* Benth. (author), the latter with leaves 3–6 cm. long and ranging from Amazonia to Guiana. Section *Cephalohyptis* Benth., 417.

Loreto: Caballo-cocha, *Williams 2267*, type.

Hyptis Parkeri Benth. Lab. Gen. & Sp. 108. 1833; 108; Epling, l.c. 85: 314. 1937.

Decumbent ascending perennial, the finely hirsute slender subterete stems 3–4 dm. long, the internodes 3–6 cm. long; leaves subsessile, elliptic or somewhat lanceolate, narrowed to a rounded truncate or subcordate base, subobtuse, 4–6 cm. long, serrate, glabrous or hirtellous; peduncles slender, hirsute, 4–5 cm. long, the fruiting heads about 8 mm. in diameter, the ovate oblong bracts 5–7 mm. long, calyx turbinate-campanulate, membranous, glabrous or hirtellous, pilose at base, 3–3.5 mm. long, the tube in fruit 3.5 mm. long, the ovate obtuse teeth scarcely 1 mm. long, 2 anterior smaller; corolla nearly white, nutlets oblong, truncate, 1.1 mm. long.—Leaves oblong-lanceolate, coarsely serrate, calyx teeth very short and obtuse or shortly subulate-acuminate (author). Cf. *H. lacustris* St. Hil. as to Peruvian specimen, which was so determined by Epling. Section *Cephalohyptis* Benth., 417.

Loreto: Río Nanay, *Williams 746* (det. Standley). To British Guiana. "Yacu-shutira" (Williams).

Hyptis pectinata (L.) Poit. Ann. Mus. Paris 7: 474, *pl. 30.* 1806; 127; 78; 268. *Nepeta pectinata* L. Syst. ed. 10. 1096. 1759.

Perennial herb, sometimes 3 meters tall, the stems indurate toward base in age, the pubescent branches and branchlets often scabrous; petioles 1–3 cm. long; leaves variable in form and size but commonly ovate, rounded or subcordate at base, acute or acuminate, 2–7 cm. long, crenate-serrate, hirtellous or rarely hirsute above, puberulent to canescent tomentose beneath; cymules lax, pectinately forked, the bracts linear-setaceous, 1–4 mm. long, the finally more or less deflexed peduncles 1–2 mm. long; calyx tube in flower scarcely 1 mm. long, in fruit 1.5–2.5 mm. long, cinereous hispidulous, the erect setaceous teeth 1–1.5 mm. long, the truncate throat hispid; corolla to 1.5 mm. long; nutlets nearly 1 mm. long.—After Epling as other descriptions. Compare *H. mutabilis* but bractlets subsetaceous; determinations by Standley. Section *Mesosphaerica* Benth., 252.

Piura: Negritos, *Haught 19.*—San Martín: San Roque, *Williams 7128.*—Huánuco: Cuchero, *Poeppig 1097.*—Apurímac: Abancay, *Vargas 402.*—Cuzco: Machu-picchu, *Vargas 794.* Without data, *Ruiz & Pavón.* Widely distributed.

Hyptis pilosa Benth. Lab. Gen. & Sp. 124. 1833; 125; 79; 280.

Erect perennial, obtusely quadrate stems sparsely hispid-pilose; branchlets slender; petioles 1–2 cm. long; leaves ovate, unevenly

crenate-serrate, rounded at base, somewhat acuminate, 5–10 cm. long, 3–6 cm. wide, green but hirtellous above, paler and tomentulose beneath; peduncles 1–1.5 cm. long, often in leafy panicles, the globose cymules 1.5 cm. across, bracts obscure or obsolete; calyx softly pilose, scarcely 4 mm. long or the fruiting tube broadly cylindric, costate, 4–5 mm. long, the acuminate teeth 0.6–1 mm. long; corolla tube 3 mm. long; nutlets 1.2 mm. long.—Type specimen probably actually collected by Tafalla from Guayaquil, distributed as Ruiz and Pavón specimens. Section *Mesosphaerica* Benth., 252.

Piura: Paita, *Haught 67*. Without data, *Ruiz & Pavón*, type. Ecuador.

Hyptis recurvata Poit. Ann. Mus. Paris 7: 467, *pl. 28, fig. 2*. 1806; 90; 85; 333.

Lightly villous slenderly branched herb; petioles 1–4 cm. long; leaves ovate, irregularly serrulate, rounded to subcordate at base, acute, usually 3–6 cm. long, 2.5–5 cm. wide, the scattered trichomes, especially on the upper surfaces, weak; peduncles slender, 2–4 cm. long, the globose heads about 1 cm. in diameter in fruit, in somewhat leafy panicles; bracts linear setaceous, 5–8 mm. long; calyx about 3 mm. long, in fruit 5 mm. long, obviously recurved and geniculate at the throat, the erect setaceous teeth subequal, about 5 mm. long; corolla usually white, about 5 mm. long, the tube 3–3.5 mm. long; nutlets oblong, obovate, asperulous, scarcely 1 mm. long.—Determinations mostly by Standley. Also without locality by Haenke and Poeppig, fide DeCandolle. Section *Cyrta* Benth., 328.

Amazonas: Chachapoyas, *Mathews*.—San Martín: San Roque, *Williams 7101*.—Loreto: Río Itaya, *Williams 125; 126; 140; 3217*. Caballo-cocha, *Williams 2026*. Iquitos, *Williams 1443; Killip & Smith 27479*. Pebas, *Williams 1700*. To Brazil, Colombia and the Guianas.

Hyptis savannarum Briq. Ann. Cons. Jard. Bot. Genève 2: 216. 1898; 89; 466.

Stout strict little-branched herb, the stems somewhat fistulose, acutely quadrate, often 5 mm. thick or thicker, glabrous; leaves long-attenuate to the obscurely petiolar base, oblong-lanceolate, acutely acuminate, 6–15 cm. long, 1.5–3 cm. wide, sparsely hirtellous only early, subcoriaceous, rather coarsely but regularly serrate; peduncles several, to 7 cm. long, the globose heads 2–3 cm. in diameter, the glabrous ovate-lanceolate bracts 8–15 mm. long; calyx tube 3.5 mm.

long, in fruit twice as long, slightly villous medially, the rigid teeth 3–5 mm. long, lightly curved apically, corolla white, the tube 6–7 mm. long; nutlets 1.5 mm. long.—*H. florida* Benth. has thinner leaves, the more slender calyx teeth rather soft; the differences are slight but apparent; found as near as southern Ecuador and probably occurs in Peru. Section *Cephalohyptis* Benth., 417.

San Martín: San Roque, *Williams 7790.* Zepelacio, *Klug 3504.* —Huánuco: Mouth of Río Chinchao, *5050.* Colombia; Central America. "Boton quihua" (Williams).

Hyptis sidaefolia (L'Hér.) Briq. Ann. Cons. Jard. Bot. Genève 2: 204. 1898; 81; 278. *Bystropogon sidaefolium* L'Hér. Sert. Angl. 19. 1788. *H. polyantha* Poit. Ann. Mus. Paris 7: 470. 1806; 124.

Suberect herb, the lightly villous sulcate branches lax and rather slender, the internodes 5–8 cm. long; petioles 1–2 cm. long; leaves irregularly serrulate, ovate, broadly rounded at base, somewhat acuminate, 3–5 cm. long, weakly and sparsely hirsutulous above, paler and early rather densely villosulous beneath; cymules finally globose, sometimes about 1 cm. across and the almost filiform peduncles 1.5–3 cm. long, laxly borne in more or less foliose panicles; calyx minutely villous, scarcely 2–5 mm. long in flower, the teeth 1.3–1.8 mm. long, the tube in fruit 3.5 mm. long; corolla purplish, the tube 4 mm. long, nutlets 1.5 mm. long.—Also at Chachapoyas, Mathews, fide Bentham; that may be *H. chachapoyensis.* Collections inadequate but Peruvian specimens probably are this species (Epling); type by Dombey. Section *Mesosphaerica* Benth., 252. F.M. Neg. 17778.

Cajamarca: Chota, *Stork & Horton 10047.*—Lambayeque: Above Lomas, 2,000 meters, *Weberbauer 7104.*—Ancash: Huertas, *1326.* Lomas de Mongón, *Goodspeed Exped. 9192* (det. Johnston). Lomas de La Chay, *Goodspeed Exped. 9203.*—Lima: Río Chillón, *Pennell 14491.* Atocongo, *Pennell 14763.* Atocongo lomas, *Goodspeed Exped. 4038; 9275; Mexia 04038.* Near Lima, *Ruiz & Pavón; Dombey,* type. Serro Augustino, *Soukup 3138.*—Huánuco: Near Huánuco, *Mathews 900.* Pampayacu, *Poeppig 1676a.* Cuchero, *Poeppig 1676.*—Junín: San Ramón, *Constance & Tovar 2226.*—Arequipa: East of Chala, *Worth & Morrison 15618.* Above Mollendo, *West 8208; Worth & Morrison 15746.* To Colombia and Venezuela.

Hyptis spicigera Lam. Encycl. 3: 185. 1789; 78; 253. *Nepeta americana* Aublet, Pl. Guian. 2: 623. 1775. *H. americana* (Aublet), Urb. Repert. Sp. Nov. 15: 322. 1918, not Briq. Naturl. Pflanzenfam. 4, Abt. 3a: 338. 1897, fide Epling.

Unpleasantly scented annual, the stems often branched only above, sulcate, glandular puberulent, the angles scabrous; leaves narrowly ovate, attenuate to the slender petioles (1–3 cm. long), acute to acuminate, ordinarily 4–6 cm. long, more or less doubly serrate, sparsely puberulent or glabrate; verticils sessile in dense cylindric spikes 2–6 cm. long or longer, at maturity 1.5 mm. in diameter; calyx tube turbinate, 1–1.5 mm. long, in fruit 4.5 mm. long, the erect setaceous teeth 1.5–2 mm. long; corolla tube 2 mm. long; nutlets 1.2 mm. long, minutely punctate, rugulose.—The determination of the specimens cited may be open to question as they have not been seen in the final draft of this account. Section *Mesosphaerica* Benth., 252.

Huánuco: Chinchao, *Ruiz & Pavón.* Without locality, *Poeppig.* Warm America.

Hyptis suaveolens (L.) Poit. Ann. Mus. Paris 7: 472, *pl. 29, fig. 2.* 1806; 126; 79; 261. *Ballota suaveolens* L. Syst. ed. 10: 1100. 1759.

Annual, slender or often robust, the fistulose obtusely quadrate stems hirsute pilose, especially toward the base, and somewhat viscid or glandular villous; petioles to 6 cm. long; leaves ovate, more or less serrate, sometimes sinuately or even subentire, rounded or lightly cordate at base, usually acute, several cm. to a dm. long, often villosulous on both sides and at least the veins more or less long-hirsute; flowers ordinarily 3–5 in rather dense cymes, the peduncles subequaling the fruiting calyces, often solitary or subfasciculate in the leaf axils or as frequently in short dense racemes in the upper axils, especially at the tips of branchlets forming spikes; calyx 4–5 mm. long, in fruit 5–7 (9) mm. long, the lightly bilabiate little declined truncate throat villous-hispid; corolla blue or sometimes purple, the subventricose tube 4–6 mm. long; nutlets 2.5–4 mm. long, compressed, truncate and emarginate.—Calyx is finally glabrate and submembranous. Section *Mesosphaerica* Benth., 252.

Piura: Weedy river bottom shrub-land, *Stork 11386* (det. Johnston). Serrán, *Weberbauer 5981.*—Arequipa: Mejia, (*Guenther & Buchtien 124,* det. Bruns). Widely distributed. "Alvaca cimarron" (Stork).

Hyptis Tafallae Benth. Lab. Gen. & Sp. 132. 1833; 132; 77; 197. *Mesosphaerum grandiflorum* Rusby, Bull. N. Y. Bot. Gard. 8: 116. 1912, fide Epling. *H. tafalloides* Mansf. Notizbl. Bot. Gart. Berlin 9: 288. 1925, fide Epling. *H. arborea* Benth. in DC. Prodr. 12: 132. 1848, as to Peru, in part.

Slender-stemmed open shrub or becoming a tree 5 meters tall with rugulose bark 2 mm. thick, beautiful in flower by the abundant panicles of purplish calyces and corollas borne on long (5–10 cm. long) peduncles in the upper axils; branchlets subterete, rufous puberulent or villous as the petioles, these to 4 cm. long; leaves closely but minutely crenulate, oblong-lanceolate, rounded or subcordate at base, rather long-acuminate, often 1- to nearly 2 dm. long, about a third as wide, finely rugulose and nearly smooth above, reddish-tomentulose beneath; bracts of the paniculate cymes linear, 2–3 mm. long; calyx subtubular, 5 or 6 mm. long, in fruit scarcely longer, the subulate teeth to 1 mm. long; corolla purple, the tube 7–8 mm. long; nutlets 2 mm. long.—Some of the following may represent *H. arborea*. Section *Umbellatae* Epl., 397. F.M. Neg. 17799.

Huánuco: Yanano, *3759*. Macora, *Ruiz & Pavón* (*Tafalla*), type. —Junín: La Merced, *Soukup 3371*. Carpapata, *Soukup 3450*. Colonia Perené, *Killip & Smith 25056*. San Ramón, *Constance & Tovar 2317; Schunke 40*. Chanchamayo Valley, *Schunke 1825*.—Ayacucho: Tambo to Río Apurímac, *Weberbauer 5608* (type, *H. tafalloides*).—Apurímac: Pacachacas Valley, *West 3791* (det. Johnston).—Cuzco: Valle Urubamba, *Herrera 3196; 1571*. Valle de Santa Ana, *Herrera 3622; Cook & Gilbert 1152; 1715*. Valle Lucumayo, *Cook & Gilbert 1373*. Near Carabaya, *Weddell 4660*. Machu-picchu, *West 6465; Herrera 1966*. Bolivia. "Tucnai" (Herrera), "hupaimuna" (Ruiz & Pavón).

Hyptis uncinata Benth. Lab. Gen. & Sp. 80. 1833; 116; 86; 349.

Robust, strict or branched above, known to attain 1 meter, the obtusely quadrate upper stems more or less hirsute; leaves lanceolate or elliptic-lanceolate, narrowed to the obsolete or short petiole, acutely acuminate, serrate except toward base, mostly 8–12 cm. long, 2–4 cm. wide, finely hispidulous, especially beneath; heads subsessile in many of the upper axils, 1–1.5 cm. in diameter, the bracts 5–6 mm. long, the rigid midnerve subhamately extended; calyx 3.5–4 mm. long, the tube in fruit 5 mm. long, urceolate, inflated, the longer rigid subulate teeth strikingly uncinate; corolla tube 4 mm. long; nutlets 1.3 mm. long. —Section *Xylodontes* Epl., 383 (subsection *Cephalohyptis* Benth.). F.M. Neg. 17798.

Huánuco(?): *Ruiz & Pavón*, type. Carpish, *Swingle 129; Ferreyra 2082; 1830; 8080*.—Cuzco: Valle Marcapata, *Weberbauer 7824*. —Puno: Chamacani, Prov. Sandía, *Metcalf 30553*. Near Oconeque, *Metcalf 30580* (straggling vine). Bolivia.

5. MENTHA L.

Aromatically fragrant herbs, lax or erect, the small flowers usually in verticils in the axils of the reduced upper leaves, sometimes all in terminal spikes or heads. Calyx campanulate or tubular, the 5 teeth equal or unequal. Corolla tube included, the campanulate limb with 4 subequal segments, the upper more or less emarginate. Stamens 4, never equal, erect, remote, the glabrous filaments smooth, the anther cells parallel. Style shortly bifid. Nutlets smooth.

Peppermint (*M. piperita* L.; cf. *M. viridis*), culinary mint (*M. arvensis* L.), and false lavender (*M. lavandulacea* Willd.) are the well-known species.

Sessile leaves glabrous, often subcordate ..... *M. viridis.*

Petioled leaves never subcordate.

Spikes mostly thicker than 1.5 cm., the lower verticils distant. *M. aquatica.*

Spikes mostly 12–15 mm. thick, the lower verticils rather crowded. *M. citratra.*

Mentha aquatica L. Sp. Pl. 576. 1753.

Stems lax or erect, lightly reflexed hirsute, the petioled leaves more or less hispidulous above, more villous or tomentulose beneath, smooth, ovate, rounded or subcordate, upper verticils usually 2–3 in globose heads or spikes; calyx tube and pedicels villous, teeth subulate.—Highly variable; often purplish-hued, especially the calyx, prostrate-ascending in wet places.

Puno: Near Limbani, *Metcalf 30479*. Ecuador to Chile and Brazil.

Mentha citratra Ehrh. Beitr. 7: 150. 1792. *M. aquatica* L. var. *glabrata* Benth. in DC. Prodr. 12: 171. 1848.

Leaves ovate-oblong, rounded at base, somewhat acute; spikes all or mostly subcapitate; otherwise like *M. aquatica*, apparently, and perhaps not distinct.

Huancavelica: Near Huanta, *Stork & Horton 10813*.—Arequipa: Near Arequipa, *Soukup*. Chile; Argentina.

Mentha viridis L. Sp. Pl. ed. 2, 2: 804. 1763.

Glabrous, or the verticils hirsute, erect, the subsessile ovate-lanceolate leaves unevenly serrate, the bractiform floral subequaling the

more or less distant or sometimes all approximate verticils; calyx teeth linear-subulate.—*M. piperita* L., similar, has petiolate leaves.

Peru (Epling). Europe; widely introduced.

6. MINTHOSTACHYS [Spach] Griseb.

Sprawling, clambering or widely branching aromatic shrub with small variously disposed flowers, the bracts somewhat foliaceous. Calyx tubular, (12) 13-veined, the 5 teeth subulate or narrowly deltoid, the throat hirsute-annulate. Corolla tube rarely 6 mm. long, the upper lobes 2, the lower 3. Stamens small, at middle of tube, at most subequaling the corolla.—The putative species are differentiated on slender grounds of pubescence, calyx differences, corolla size and leaf habit; one frequently doubts the existence of more than one highly variable species; nevertheless, Epling noted that forms with close resemblance are often found in various parts of a wide range; he also discussed the similar but relatively distinct group *Bystropogon* L'Hér. (Repert. Sp. Nov. Beih. 85: 162–163. 1936). There is no resolving the specific problems here unless cytological investigations and new observations explain the relative significance of the seemingly tenuous characters. I have only had patience to try some reduction in characters but many specimens are poorly applicable and all the Andean forms ought to be studied together; I have not considered *M. verticillata* (Griseb.) Epl., l.c. 167, of Argentina, which is not contrasted by Epling, l.c. 164 (as also several Bolivian states, except geographically, obviously allied to the Peruvian). *B. dentatus* Poir., Encycl. suppl. 1: 755. 1810, described: "leaves ovate, hirsute, serrate, verticils hispid," has apparently not been identified, and ex char., of course is a nomen nudum. For *M. mollis* see note under *M. tomentosa*.

KEY TO MINTHOSTACHYS (after Epling)

Calyces shortly hirtellous without..... (*M. andina*), *M. salicifolia*.

Calyces rather densely hirsute without.

Corolla tube 2.5–4 mm. long (often about 3 mm. long). (*M. mollis*), *M. tomentosa*.

Corolla tube 3.5–5 mm. long (often about 4 mm. long).

Calyx teeth narrowly deltoid..... *M. spicata*.

Calyx teeth subulate.

Calyx teeth equaling or exceeding the tube.

Leaves sparsely hirtellous; verticils sometimes close at branchlet tips, often remote.....*M. setosa.*

Leaves subtomentose beneath; verticils often in spikes. (*M. mollis*), *M. tomentosa.*

Calyx teeth shorter than tube.....*M. tomentosa.*

ALTERNATE KEY

(Eliminating some Ecuador species, at least as to types)

Calyces puberulent, the subulate teeth rigid.

Leaves sparsely short-pubescent; calyces 3–3.5 mm. long. *M. salicifolia.*

Leaves pulverulent; calyces 2–2.5 mm. long.....*M. andina.*

Calyces villous-hirsute or hirtellous, at least toward base.

Calyx teeth subulate, rigid, erect or suberect tips glabrate or puberulent; leaves somewhat canescent even in age. *M. Mandoniana, M. setosa.*

Calyx teeth herbaceous, firm only in age or the somewhat lax tips indurating; leaves cinereous pilosulous at least beneath. (*M. mollis*), *M. tomentosa.*

Calyx teeth lance-subulate, usually subrigid but often spreading or recurving, usually cinereous hispidulous-villous; quite mature leaves glabrous or nearly.....*M. spicata.*

Minthostachys andina (Britton) Epl. Repert. Sp. Nov. Beih. 85: 166. 1936. *Bystropogon andinus* Britton ex Rusby, Bull. Torrey Club 27: 83. 1900.

Finely and closely tomentulose all over, the many very slender branchlets about 2 cm. long; petioles 2–3 mm. long; leaves ovate to oval, rounded or very slightly produced at base, obtuse, 5–8 mm. (5–25 mm., Epling) long, 4–7 mm. wide, gray-green, obscurely and sparsely serrate, the veins prominent beneath; verticils shortly pedunculate, 5–10-flowered, the sessile calyces 2.5 mm. long, faintly nerved, the ovate acute lobes 0.5 mm. long; corolla 2 mm. long, the tube and limb subequal.—After Rusby, the type not seen; the Peruvian specimen is greenish pulverulent, the larger leaves ovate-lanceolate, subobtusely acuminate, about 1.5 cm. wide, 5 or 6 cm. long, corolla about 2.5 mm. long; it may represent *M. diffusa* Epl., l.c. 167, but that seems to be similar except for its larger acuminate leaves and may be a variant; like the type of *M. andina*, it is from the province of La Paz.

Cuzco: Valle de San Miguel, Machu-picchu, 2,400 meters, *Herrera 1996; Vargas 836*. Bolivia.

Minthostachys Mandoniana (Briq.) Epl. Repert. Sp. Nov. Beih. 85: 167. 1936; 63. *Bystropogon Mandonianus* Briq. Ann. Cons. Jard. Bot. Genève 2: 192. 1898.

Divaricate branches finally glabrate, internodes to 4 cm. long; petioles 1 cm. long; leaves ovate, rounded at base, more or less acuminate, mostly 2.5 cm. long, 17 mm. wide, the few teeth small, green but appressed pubescent above, the indument beneath dense, canescent, the 4–5 lateral nerves inconspicuous; verticils more or less villous, the uppermost subspicate, many-flowered; pedicels to 2 mm. long; calyx finally 4 mm. long, tube 2.5 mm. long, teeth lanceolate-subulate, 1.5 mm. long; corolla well-exserted, the tube 5 mm. long.—After Briquet, who distinguished it from *B. mollis* HBK. by the many larger verticils and longer calyx, the Bolivian type (*Mandon 516* in part) mixed with (fide Briquet) that species, but *B. mollis* at least typically doubtfully occurs in Bolivia. The Killip and Smith collection was referred by Epling to *M. setosa* (Briq.) Epl. with the reservation, "differs in aspect and pubescence," but the calyx teeth are narrowly subulate; only a single variable species may be concerned.

Ayacucho: Ccarrapa, *Killip & Smith 22308*. Bolivia.

Minthostachys salicifolia Epl. Repert. Sp. Nov. Beih. 85: 165. 1936; 63.

Suffrutescent, the long slender glabrate branches ascending in bush-wood; petioles 1 cm. long; leaves numerous, subentire, narrowly ovate-lanceolate, rounded or shortly acute at base, long-acuminate, the larger to 1 dm. long, 2.5 cm. wide, glabrous or nearly above, sparsely short-pilosulous on nerves and veins beneath; verticils few-flowered; calyx 3 mm. long, sparsely puberulent-hirtellous even to base, the subulate teeth about 1.2 mm. long; corolla tube 3.5 mm. long, the corolla thus rather obvious.

Ayacucho: Near Huanta, *Weberbauer 7578*, type.

Minthostachys spicata (Benth.) Epl. Repert. Sp. Nov. Beih. 85: 165. 1936; 61. *Bystropogon spicatus* Benth. Lab. Gen. & Sp. 326. 1834; 185. *B. glabrescens* Benth. Pl. Hartw. 145. 1844, only as to Peru.

Aromatic, suffrutescent, clambering in rocks or among shrubs, the villosulous indument more or less promptly caducous from the stems

and ovate leaves, these somewhat rounded or often produced basally, acute, sometimes serrate, often 4 cm. long, 2.5 cm. wide or larger, those of flowering branchlets reduced; verticils usually many-flowered, ordinarily crowded on short branchlets or not infrequently in long terminal spikes; calyx hispidulous especially toward base, about 3–4 mm. long, the narrowly lanceolate teeth shorter than tube, the white or rarely violet-spotted corolla little exserted.—Shrub, the branches glabrous as their leaves both sides, these ovate or ovate-lanceolate, subserrate, crowded at base, subacute, 2.5–3.5 cm. long, the much smaller floral canescent-tomentose both sides; verticils dense, oblong or subglobose, the upper spicate; lanceolate teeth of very villous calyx scarcely longer than corolla; fertile stamens often 5 (Bentham). Epling has noted *Pennell 14347* as "very like type but smaller leaves more glabrous." *Weberbauer 7303* is tardily glabrous and shorter calyces are very pubescent at base.

Lima: San Buenaventura, 2,700 meters, *Pennell 14563*. Matucana, *415*. Near Canta, *Pennell 14347; Mathews 559* (det. Bentham). Río Blanco, *Killip & Smith 21692*. Purruchuca, *Mathews*, type.—Huancavelica: Mejorada, *Stork & Horton 10906*. Near Cordova, *Metcalf 30285*.—Ayacucho: Near Ayacucho, *Weberbauer 5527*. Coracora, *Weberbauer 5789*. Prov. Lucanas, *Metcalf 30329*.—Cuzco: Checacupe, *Pennell 13532*. Chicón, *Vargas 11057*. Misha-huara, *Herrera 1527*. Near Cuzco, *Pennell 13573*. San Sebastian, *Pennell 13623*.—Moquegua: Carumas, *Weberbauer 7303?* (early pubescent). "Oj unu-muña" (Herrera).

Minthostachys setosa (Briq.) Epl. Repert. Sp. Nov. Beih. 85: 166. 1936. *Bystropogon setosus* Briq. Bull. Herb. Boiss. 4: 801. 1896.

A meter or two tall, the divaricate branches cinereous pilose, the elliptic-lanceolate ("ovate," Epling) leaves green, sparsely hirsutulous, the calyces, except the glabrescent lanceolate-setaceous ("deltoid-lanceolate, scarcely acuminate," Epling) teeth, setose-hirsute; leaves cuneate, rounded at base, acute or acuminate, minutely or not serrulate, 3–4 mm. wide, 12–15 mm. long ("2–7 cm. long," Epling); verticils globose, in axils of upper leaves; corolla white, exserted, the tube 3–3.5 mm. long; calyx 2.5–2.8 mm. long ("1.5–2.5 mm. long," Epling).—Facies of *M. mollis* (HBK.) Griseb. but leaves and flowers resemble those of *B. glabrescens* Benth. with glabrous leaves; the bristly calyces give it a particular aspect (Briquet); cf. *M. Mandoniana* (Briq.) Epl. Leaves of the Puno plant are larger, less acuminate (Epling); this specimen looks like *M. Mandoniana* of Bolivia.

Cuzco: Valle Paucartambo, *Vargas 11155;* (*Herrera 2988*). Pillahuata, *Pennell 14083.* Near Marcapata, *Weberbauer 7879.*—Puno: Ticuani, *Hicken 52.* Near Limbani, *Metcalf 30499?* Bolivia. "Muña" (Herrera).

Minthostachys tomentosa (Benth.) Epl. Repert. Sp. Nov. Beih. 85: 165. 1936; 61. *Bystropogon tomentosus* Benth. Lab. Gen. & Sp. 326. 1834; 185. *B. mollis* HBK. Nov. Gen. & Sp. 2: 317. 1818, as to Peru. *B. canus* Benth. l.c. *B. Pavonianus* Briq. Ann. Cons. Jard. Bot. Genève 2: 193. 1898?

A very pungent more or less villous or villous-tomentose perennial, the sprawling stems glabrate and exfoliating toward the subligneous base and when supported in shrubs or trees sometimes several meters long, the arcuate-divaricate branches closely or remotely floriferous; leaves ovate or ovate- to oblong-lanceolate, rounded to somewhat narrowed to base, acute to acuminate, subentire, serrulate or now and then serrate, in age glabrate or glabrous above, early often canescently villous-tomentose beneath or merely pilosulous-puberulent, usually 2–3 cm. long and nearly as wide, the upper reduced, or the lower early deciduous and considerably longer; verticils ordinarily pedunculate, the usually pedicellate calyces few to many, villous-hispidulous including the narrowly lanceolate acuminate scarcely or not indurate teeth, these about as long (1–1.5 mm.) as the tube or the latter longer; corolla white, purple or lavender veined or mottled, more or less exserted.—Description has been drawn to include the following: *B. Pavonianus* Briq., with suboblong puberulent leaves, few-flowered verticils, and small flowers, may be separable and perhaps is represented by *Weberbauer 6253,* referred by Epling in 1926 to *M. andina,* in 1931 to *M. mollis,* in which he also included most of the Peruvian specimens cited herewith; however, *M. mollis* (HBK.) Griseb. as to the Ecuador type seems consistently to have villous subulate-setaceous calyx teeth and may be as distinct as other Peruvian forms. Bentham wrote: *B. spicatus, B. tomentosus* and *B. canus* could be variants of one species. Nevertheless, he restricted *B. mollis* to Ecuador. Types of *B. canus* Benth. and *B. Pavonianus* Briq. are at Geneva where suggested by Epling to be the same; my interpretation of *M. tomentosa* is based on the Dombey (Ruiz and Pavón) collection at Paris, probably part of type, lightly villous, the calyx herbaceous. Epling, by recent reference of Redoutt specimen to *M. mollis* may have broadened his interpretation. F.M. Neg. 28986 (*B. Pavonianus*).

The natives apply a concoction of this plant with salt in hot baths and take hot infusions as an aperitive and diuretic (Ruiz and Pavón); I noted it taken as a tea and used as seasoning.

Cajamarca: Río Tabaconas, *Weberbauer 6253?* (cf. note above). —Amazonas: Chachapoyas, *Mathews 3157* (det. Bentham).—La Libertad: Prov. Celendín, (*Redoutt 0454*, det. Epling). Cachicadán, *Stork & Horton 9957*.—Lima: Matucana, *399; Soukup 2071*. La Oroya Highway, 90 km. from Lima, *Goodspeed & Weberbauer 33055*. —Huánuco: Near Huánuco, *2104; Ruiz & Pavón* (Dombey), type; *Soukup 3119*. Pillao, *Woytkowski 34079*. Mito, *1516*.—Junín: Tarma, *990; Isern 2092; Killip & Smith 21786; 24252; Constance & Tovar 2372*. "Chancas" (Stork & Horton), "muña," "hupaimuña" (both Ruiz & Pavón).

7. SATUREJA [Tourn.] L.

Gardoquia R. & P. Prodr. 86, *pl. 17*. 1794. *Rizoa* Cav. Anal. Cienc. Nat. 3: 133. 1801. *Micromeria* Benth. Bot. Reg. 15: *pl. 1282*. 1829.

Reference: Epling, Ann. Mo. Bot. Gard. 14: 47–86. 1927; Repert. Sp. Nov. Beih. 105: 47–58. 1938.

Perennials, various in habit but usually suffrutescent, rarely prostrate, the pubescent to nearly glabrous but more or less punctate leaves almost minute to medium size, sometimes imbricate, the inconspicuous to showy and often red flowers ordinarily 1 to several and then usually somewhat cymose in the axils, exceptionally (not yet known in Peru) the cymes spicate (*S. stachyodes* Epl. of Ecuador). Calyx tubular to campanulate, 13–15-veined, more or less bilabiate, the lower teeth free, the throat glabrous to hirsute. Corolla graduated, ordinarily slightly arcuate, the erect upper lip emarginate, the lower about as long, spreading. Stamens above the middle of tube, didymous but subequal, filaments glabrous, connective deltoid, cells divaricate.—Briquet, Naturl. Pflanzenfam. 4, Abt. 3a: 300. 1897, recognized as sections *Hesperothymus* (Benth.) Briq., long solitary pedicels ebracteolate, prostrate herb (*S. Brownei* (Sw.) Briq. possibly will be found in Peru); section *Gardoquia* (R. & P.) Briq., l.c.; and section *Xenopoma* (Willd.) Briq., l.c., more or less suffrutescent, rarely prostrate, pedicels bibracteolate, weakly defined by Epling, the first with red, rarely pale or violet corollas often 1.5 cm. long or longer, the latter with pale or tinted corollas, the tube to about 7 mm. long, perhaps an arbitrary or expedient classification. The supplementary key has been devised especially for determination of specimens not in flower.

KEY TO SATUREJA (after Epling)

Flowers as leaves small, the former rarely tinted; corolla tube 1–7 mm. long, the leaves rarely 2 cm. long.

Prostrate plant soon forming mats.....*S. nubigena.*

Erect-ascending shrubs.

Corolla tube at least 2.5 mm. long.

Leaves round-ovate.

Leaves 8–10 mm. wide; flowers 3–6 in axils.....*S. vana.*

Leaves 3–5 mm. wide; flowers solitary.....*S. brevicalyx.*

Leaves obovate-elliptic, little rounded; flowers solitary or fasciculate on short branchlets.....*S. boliviana.*

Corolla tube 1–1.5 mm. long, flowers usually solitary. *S. parvifolia.*

Flowers often showy and red or the leaves a cm. long or longer; corolla tube rarely only 8–10 mm. long, rarely orange or pale.

Leaves mostly 3–10 mm. long; corolla tube (12) 15–25 mm. long.

Leaves glabrous.

Leaves obovate or oblanceolate, veins obscure.

Leaves glabrous, subsessile.....*S. guamaniensis.*

Leaves canescent beneath, petioled.....*S. Ruizii.*

Leaves narrowly ovate, striate-veined beneath.....*S. striata.*

Leaves pubescent.

Leaves linear, the indument sericeous.....*S. sericea.*

Leaves about ovate, if sericeous only above.

Leaves revolute, entire (cf. *S. clivorum*).

Leaves glabrous above.....*S. revoluta.*

Leaves puberulent or sericeous above.....*S. argentea.*

Leaves serrulate, plane.....*S. plicatula.*

Leaves mostly at least 1 cm. long, usually much longer; corolla tube 8–30 mm. long.

Leaves green, subglabrous; corolla tube 25–30 mm. long. *S. elliptica.*

Leaves more or less hirtellous or tomentose; corolla tube 8–25 mm. long.

Corolla tube mostly 2–2.5 cm. long.

Leaves mostly 1–2 cm. long (cf. *S. Vargasii*).

Lower calyx teeth subulate; leaves greenish.
S. Mathewsii.
Lower calyx teeth narrowly deltoid; leaves canescent.
Leaves often elliptic, acute, entire.....*S. incana.*
Leaves often ovate-rotund, obtuse, subcrenate.
S. pulchella.
Leaves mostly 2–4 cm. long.
Leaves sericeous, entire.....*S. acutifolia.*
Leaves hispidulous above, crenate.....*S. pulchella.*
Corolla tube mostly 1–2 cm. long.
Leaves entire.
Leaves often elliptic, subsessile; corolla tube 12–14 mm. long.
Leaves cinereous puberulent both sides.
S. Lopezii, S. Loeseneriana.
Leaves shortly appressed hirtellous...*S. Weberbaueri.*
Leaves rhomboid-ovate; petiolate; corolla tube 18–20 mm. long.....*S. Mathewsii.*
Leaves more or less crenate-serrate.
Corolla tube 1.5–2.5 cm. long.
Calyx teeth about 2.5 mm. long.....*S. pulchella.*
Calyx teeth 3.5–4 mm. long.....*S. panicera.*
Corolla tube 8–10 mm. long.
Leaves densely villous beneath.....*S. rugosa.*
Leaves green, the crisp pubescence sparse.
S. sphenophylla.

SUPPLEMENTARY KEY

Leaves small, at least mostly narrower than 5 mm., rarely 4 mm. wide, rarely some on older branchlets to 1 cm. wide.
Leaves characteristically revolute, especially the younger.
Leaves obviously longer than wide.
Indument dense, sericeous.
Leaves ovate-lanceolate; corolla about 1.5 cm. long.
S. argentea.
Leaves linear-lanceolate; corolla about 2 cm. long.
S. sericea.
Indument obscure or sparse, minute.....*S. Weberbaueri.*

Leaves deltoid-ovate or subrotund.....*S. revoluta.*

Leaves plane or essentially, even the younger.

Plant prostrate, soon forming mats.....*S. nubigena.*

Plant suffrutescent, erect or ascending.

Leaves closely imbricate, subappressed, striate-veined.
S. striata.

Leaves more or less spreading, laxly or not at all imbricate.

Flowers about 2 cm. long; leaves oblanceolate or ovate.

Leaves oblanceolate, entire.

Leaves glabrous, subsessile; calyx 4–5 mm. long.
S. guamaniensis.

Leaves canescent beneath, petiolate.....*S. Ruizii.*

Leaves ovate, serrulate.....*S. plicatula.*

Leaves deltoid, entire.....*S. clivorum.*

Flowers much shorter.

Calyx tubular, at least twice longer than thick.
S. boliviana.

Calyx subturbinate-campanulate.

Corolla scarcely exserted.....*S. parvifolia.*

Corolla clearly exserted.....*S. brevicalyx.*

Leaves wider than 5 mm., at least the majority much wider.

Leaves green or greenish, not cinereous either side, entire or subentire (cf. *S. Vargasii*).

Leaves subrotund, about 1 cm. wide, little longer.....*S. vana.*

Leaves ovate-elliptic, often subacute, about 2 cm. long.
S. Lopezii, S. Loeseneriana.

Leaves green, glabrate or sparsely pubescent, serrate.

Leaves crisped pubescent beneath, 3–6 cm. long; flowers 1 cm. long.....*S. sphenophylla.*

Leaves glabrate, 1–3 cm. long; flowers about 3 cm. long.
S. elliptica.

Leaves, at least younger, more or less villous beneath, serrate.
S. rugosa.

Leaves, at least beneath, cinereous puberulent or tomentose.

Leaves crenate-serrate, tomentose beneath.

Calyx teeth deltoid-lanceolate, about 3.5 mm. long.
S. panicera.

Calyx teeth lanceolate-subulate, about 2.5 mm. long. *S. pulchella.*

Leaves entire or rarely obscurely or sparsely serrulate, more or less cinereous puberulent.

Leaves mostly shorter than 2 cm., often rounded or obscurely apiculate.

Leaves rather subconcolor; lower calyx teeth subulate.

Leaves oblanceolate, revolute.....*S. Ruizii.*

Leaves rhomboid, plane or laxly revolute..*S. Mathewsii.*

Leaves obviously canescent beneath; lower calyx teeth lanceolate-deltoid.....*S. incana.*

Leaves mostly longer than 2 cm., all somewhat ovate-acuminate.....*S. acutifolia.*

Satureja acutifolia (Benth.) Briq. Naturl. Pflanzenfam. 4, Abt. 3a: 300. 1897; 50. *Gardoquia acutifolia* Benth. in DC. Prodr. 12: 236. 1848.

Shrubby, more or less appressed sericeous, including calyces, the leaves in age rather gray or white tomentose beneath but venation obvious; leaves rather elliptic, shortly narrowed into petioles 1–3 mm. long, subacuminate and subacute, somewhat revolute, 2–2.5 (3) cm. long; pedicels 3 in the axils, 1–2 mm. long; calyx tube to about 6 mm. long, upper lobe 3 mm. long, deltoid subulate teeth 2 (–4) mm. long, the acuminate lower ones 2.5 mm. long; corolla tube 2–2.5 cm. long, gradually ampliate.—Stork and Horton specimens hardly sericeous and calyx teeth as much as 4 mm. long (Epling); crushed leaf, odor of spearmint; corolla yellowish-orange, redder in age (Stork & Horton). F.M. Neg. 29173.

Cajamarca: Sucse Río, west of Socoto, 2,800 meters, *Stork & Horton 10797.*—Amazonas: Chachapoyas, *Mathews 1522,* type; also *3153.*

Satureja argentea (HBK.) Briq. Naturl. Pflanzenfam. 4, Abt. 3a: 300. 1897; 237; 54. *Gardoquia argentea* HBK. Nov. Gen. & Sp. 2: 313. 1818.

Sprawling in thickets to 1.5 meters or in the open more or less procumbent, early silvery with an appressed sericeous indument including the calyces; leaves sessile, entire, revolute, ovate, obtuse, 3–8 mm. long, about a third as wide at the rounded base, glabrate above in age; pedicels solitary or few, 2 mm. long; calyx 3.5–5 mm.

long, the ovate upper teeth less than 1 mm. long, the lower deltoid, 1.2 mm. long, acute; corolla light red, the tube 12–15 mm. long, the lip about 2.5 mm. long, subequal.—Habit from Woytkowski's field note, the leaves as flowers with a sharp but agreeable odor. F.M. Neg. 17678.

Cajamarca: Hualgayoc, *Bonpland*, type. Chota, *Raimondi*. Celendín, *Woytkowski 18*.—Amazonas: Donila to Cohechan, *Soukup 4138*.—Huánuco: Llata, *2238A* (mixed with type of *S. plicatula*).

Satureja boliviana (Benth.) Briq. Naturl. Pflanzenfam. 4, Abt. 3a: 300. 1897; 57. *Micromeria boliviana* Benth. Lab. Gen. & Sp. 731. 1835; 222.

Puberulent or in Peru somewhat hirtellous shrub sometimes a meter high; leaves narrowly obovate to rather elliptic, narrowed to short (1–1.5 mm.) petioles, subobtuse, entire to serrulate, often 1–2 cm. long; flowers whitish, subsessile and solitary or fasciculate on short axillary branchlets; calyx tube 2–2.5 mm. long, acute deltoid teeth all scarcely 1 mm. long; corolla tube 6–7 mm. long, pubescent within; stamens shortly exserted; nutlets oblong, 1.5 mm. long, usually with mucro to 0.5 mm. long, puberulent above.—Typical form glabrate with narrowly obovate entire leaves; *Metcalf 30707* and to a less extent his *30435* approach var. *tarijensis* (Wedd.) Epl. (leaves larger, rhomboid-elliptic, more or less serrulate) but in Peru the branchlets have a dense retrorse curled pubescence instead of a somewhat spreading hirtellous indument; also, leaves cinereous and hirtellous, flowers fascicled in short axillary branchlets (Epling).

Cuzco: Hacienda Charu, Valle Paucartambo, *Herrera 144*.—Puno: At 7 km. from Cuyocuyo, *Metcalf 30707; Weberbauer 863*. South of Limbani, *Metcalf 30435*. Near Chucuito, *Metcalf 30687* (typical). Azangaro, *Lechler 1786*. To Argentina.

Satureja brevicalyx Epl. Ann. Mo. Bot. Gard. 14: 82. 1927; 56.

Rather resembles *S. parvifolia* but the indument scarcely more than a pulverulence, the leaves mostly rotund-ovate or obovate and narrowed to base, 3–5 (–10) mm. long; pedicels solitary, 3.5 mm. long; calyx tube campanulate, 1.8 mm. long, the subequal oblong-ovate subobtuse teeth about 1 mm. long, somewhat spreading in age; corolla tube moderately ampliate, pubescent within, 4–7 mm. long, the stamens affixed above the middle; nutlets ovate, fuscous, 0.5 mm. long.

Apurímac: Chincheros, *West 3725* (det. Johnston).—Cuzco: Near Cuzco, (*Herrera 825*, type); *Herrera 78*. Saxaihuamán, *Herrera 825; 847; Pennell 13593*. Panticalla Pass, *Cook & Gilbert 1877*. Between Pincao and Apurímac Ríos, *Weberbauer 5865*. Huilca, *Vargas 2398*. Paruro, *Vargas 900*. "Oregano de los Incas," (West); "muña" (Soukup); "Cjunu-muna," "cjunucc" (Herrera).

Satureja clivorum Epl. Brittonia 12: 145. 1960.

A much-branched apparently repent shrub, the branches attaining 3 dm., sparsely pubescent with appressed ascending trichomes; leaves deltoid, about 1 cm. long, the appressed trichomes stouter (subhirsute), veins impressed above, margins sometimes revolute; calyx in flower 5 mm. long, the thick nerves appressed hirsute, the unequal teeth narrowly deltoid-subulate; tube of the reddish corolla 14 mm. long, hirsute within under lower lobe, the subequal lips 4–5 mm. long, lobes rounded; stamens shortly exserted from tube, affixed about above the middle; style glabrous.—Approximates such species as *S. argentea, S. revoluta* and *S. plicatula* (author). Section *Gardoquia*.

La Libertad: Otuzco, 3150 meters, (*A. López M. 1555*, type).

Satureja elliptica (R. & P.) Briq. Naturl. Pflanzenfam. 4, Abt. 3a: 300. 1897; 48. *Gardoquia elliptica* R. & P. Syst. Veg. 149. 1798; 235. *G. pilosa* Gray, Proc. Am. Acad. 5: 341. 1862, fide Epling. *Stachys speciosa* Hook. Bot. Misc. 2: 235. 1831.

Aromatic shrub attaining a meter and a half, nearly glabrous or the leaves sometimes sparsely hirsutulous as the calyces; petioles 2–5 mm. long; leaves elliptic to rotund-ovate, narrowed or obscurely rounded at base, obtuse or rounded at apex, crenate-serrate to subentire, 1–3 cm. long, 8–15 mm. wide; cymes in upper axils, to 15-flowered, leafy, the peduncles 2–5 mm. long; calyx tube 5–7 mm. long, the lobes 3–4 mm. long, the 2 acute anterior teeth deltoid or lanceolate, the posterior to 2 mm. long; corolla tube yellowish or red, 2.5–3 cm. long; stamens exserted 7–8 mm.; nutlets obovate, 2 mm. long.—Corolla varying from cadmium yellow to scarlet, the reds predominating (Pennell); Killip noted the error of Index Kewensis as Fiji Islands for *G. pilosa*.

Lima: Baños, Prov. Canta, (*Wilkes Exped.*, type, *G. pilosa*). Obrajillo, *Cruickshanks* (type, *S. speciosa*); *Pennell 14401*. In rocks, Huaros, *Pennell 14734*. Cheuchin and Sayán, *Dombey*, type.

Satureja guamaniensis Mansf. Notizbl. Bot. Gart. Berlin 9: 286. 1925; 53.

Shrub (type a meter tall), glabrous or essentially including the calyces without, the many quadrate branchlets densely leafy in flower; leaves obovate or oblanceolate, entire or with 2–3 minute teeth toward the rounded tip, little or not at all revolute, somewhat lustrous above, slightly paler beneath, often 5–7 mm. long, 3–4 mm. wide; pedicels solitary, 2 mm. long; calyx 5–6 mm. long, hirsute within at throat, the narrowly ovate acute subequal teeth about 1 mm. long; corolla about 23 mm. long, much ampliate above the calyx, the tube pilosulous within, the lips subequal, to 5 mm. long; exserted stamens submedial. This is *S. obovata* fide Epling, i.e. *S. Ruizii* which compare.

Piura: Huancabamba to Ayavaca, *Weberbauer 6323*, type.

Satureja incana (R. & P.) Spreng. Syst. 2: 719. 1825. *Gardoquia incana* R. & P. Syst. Veg. 148. 1789; 237. *S. Pavoniana* Briq. Ann. Cons. Jard. Bot. Genève 2: 189. 1898; 49. *S. mantaroensis* Mansf. Notizbl. Bot. Gart. Berlin 9: 287. 1925, fide Epling.

A slender or often much branched shrub a meter or two tall, the many leaves permanently (at least below) canescent with a close tomentum especially beneath, the branchlets soon glabrate; petioles 1–2 mm. long; leaves mostly elliptic, typically quite entire, rarely somewhat serrate, acute at base, rounded or slightly narrowed to the obtuse or subacute tip, the mature usually 1.5–2 cm. long, about half as wide, or somewhat larger, especially narrower; flowers red to pink-orange, (1) 3–5, the cinereous calyx to about 6 mm. long, the teeth acute, narrowly ovate, the somewhat longer lower 1.5–2.5 mm. long; corolla tube 1.8–2.5 cm. long, gradually ampliate, pilose also within; stamens above the middle; nutlets oblong, often emarginate, 2 mm. long.—F.M. Neg. 29118.

The native names listed by Ruiz and Pavón under a similar unpublished name for a Tarma species probably refer to this, which they noted used for melancholy or lassitude, in wine or rum with water; apparently an early version of some modern tranquilizing drug, but perhaps pleasant to take.

Huánuco: Acomayo to Carpis, *Mexia 04123* (det. Johnston). Yanahuanca, *1196*. Mito, *1411*. Acomayo, *Woytkowski*.—Junín: Prov. Huancayo, *West 3632; Stork & Horton 10224; Killip & Smith 23356*. Huacapistana, *Constance & Tovar 2250* and near Tarma, *2359; Ruiz & Pavón*, type; *Killip & Smith 21834; 24121*. Near

Huancayo, *Killip & Smith 22155; 22174.* Carpapata, *Killip & Smith 24335.* Near La Oroya, *Kalenborn 82.*—Huancavelica: Mantaro, *Weberbauer 5677* (type, *S. mantaroensis*). Pampas, *Raimondi.* "Chinchi," "sacconche," "suyunmpai" (Ruiz & Pavón), "pichucita."

Satureja Loeseneriana Mansf. Notizbl. Bot. Gart. Berlin 9: 287. 1925; 53.

An essentially glabrous shrub sometimes a meter tall, any indument a mere pulverulence except on the purple flowers, these scarcely 1.5 cm. long; leaves subsessile, entire or minutely serrulate, oval- or elliptic-obovate, rounded or obtuse, rarely subacute, mostly 8–10 mm. wide, 1.5–2 cm. long; pedicels solitary or few, about 1 mm. long; calyx tube about 4.5 mm. long, teeth acute, the narrowly ovate upper to 1 mm. long, the lower similar about 1.5 mm. long; corolla tube 12 mm. long, subequal tip 2.5 mm. long; stamens above the middle.—In rocks, the deep violet flowers highly fragrant (Woytkowski).

Cajamarca: Celendín, *Woytkowski 12.*—La Libertad: Huamachuco, *Weberbauer 7008,* type; *Raimondi.*—Ancash: *Raimondi.* Colombia?

Satureja Lopezii Epl. Brittonia 12: 145. 1960.

Shrub, the branches apparently rigid, minutely hirtellous all over above, the internodes to 1.5 cm. long; leaves rhomboid-ovate or elliptic, mostly 1.5–5 cm. long, entire, shortly petioled, the impressed veins subprominent beneath; flowers in axils of reduced upper leaves, pedicels 2–3 mm. long; calyces costate, 6 mm. long, shortly bilabiate, the teeth 1–1.5 mm. long, deltoid, acuminate; corolla purple, tube 10–11 mm. long and lips hirtellous outside; stamens affixed below throat; style glabrous.—Not dissimilar to *S. cercocarpioides* Epl. Repert. Sp. Nov. Beibl. 85: 153. 1936, of Ecuador, Colombia.

La Libertad: Los Manzanos, Chuco to Angasmarca, 3475 meters, (*A. López 2332,* type). Cachicadán, 2700 meters, (*López 1969*).

Satureja Mathewsii Briq. Ann. Cons. Jard. Bot. Genève 2: 189. 1898; 52.

Shrub, glabrous or glabrate except for a close slightly cinereous pulverulence on the leaves beneath and the calyces; petioles slender, 3–5 mm. long; leaves subrhomboid to subrotund, entire, often slightly revolute, more or less narrowed to base, rounded or obtuse at apex, many about 1 cm. wide and little longer; flowers solitary to several;

pedicels 2 mm. long; calyx nearly 1 cm. long, minutely puberulent, not pubescent in throat, the spreading almost setaceous-subulate teeth about 2.5 mm. long; corolla 1.5–2 cm. long, the tube about 18 mm. long; stamens above the middle.—F.M. Neg. 29115.

Cajamarca: Near San Felipe, *Weberbauer 7109*.—Amazonas: Chachapoyas, *Mathews*, type; (*Ferreyra 7134*). Toward Molinopampa, (*Sandeman*).

Satureja nubigena (HBK.) Briq. Naturl. Pflanzenfam. 4, Abt. 3a: 300. 1897; 58. *Thymus nubigenus* HBK. Nov. Gen. & Sp. 2: 316. 1818.

Prostrate creeping, the many more or less herbaceous branches forming mats, glabrate to puberulent-hispidulous; leaves subsessile, mostly broadly ovate, ordinarily 2–4 (10) mm. wide and little longer if any, entire or nearly, rarely glabrous; pedicels very short, solitary; calyx 2–2.5 mm. long, teeth ovate, acute; corolla white or violet, the tube slightly exserted, pubescent within; nutlets nearly 1 mm. long.

Cajamarca: Chota, *Raimondi*.—Huánuco: Mito, *1821*. Tambo de Vaca, 4,000 meters, *4399*.—Cuzco: Hacienda Marcachea, Prov. Paucartambo, *Vargas 11154* (det. Standley). To Colombia and Venezuela.

Satureja panicera Epl. Bull. Torrey Club 68: 553. 1941.

Shrub, to 1.5 meters tall; branchlets subappressed hirtellous; petioles 2–5 mm. long; leaves rhomboid and cuneate at base or deltoid-ovate and truncate-subcordate, all obtuse, 1–2.5 cm. wide, serrate-crenate, revolute, rugose, glabrous above, densely white tomentose beneath; flowers about 6 in shortly peduncled axillary cymules with linear bractlets 3–4 mm. long; calyx crisply hirtellous, tube about 6 mm. long, teeth deltoid-lanceolate, acute, the lower 3.5–4 mm. long, the upper similar, basally connate; corolla orange, the tube 2–2.5 cm. long, the upper lobe 4–5 mm. high.—Resembles *S. rugosa* (R. & P.) Briq. and *S. tomentosa* (HBK.) Briq. but calyx of first 7 mm. long, the fine pubescence spreading, the teeth 2.5 mm. long, corolla tube about 1 cm. long, while the calyx teeth of *S. tomentosa* are rarely longer than 2.5 mm. (author); sold in Trujillo as a medicinal herb (collectors). Compare with *S. pulchella* (HBK.) Briq. but that with basally acute leaves. Distinguishable from *S. rugosa* primarily by the appressed hirtellous pubescence; both taxa recall *S. tomentosa* of Ecuador and differ chiefly by their deltoid-

truncate leaves (author). My *2084* from Huánuco seems much closer to *S. tomentosa* (Epling), i.e. *S. pulchella.*

La Libertad: Cachicadán, 2,800 meters, *Stork & Horton 9956*, type; (*Redoutt 2314*).—Ancash: Pallasca, (*A. López 2396*). "Panicera" (collectors).

Satureja parvifolia (Phil.) Epl. Repert. Sp. Nov. Beih. 85: 159. 1935; 56. *Oreosphacus parvifolia* Phil. ex Leyb. Excurs. Pampas 45. 1873. *Micromeria Gilliesii* Benth. Lab. Gen. & Sp. 381. 1834, not *S. Gilliesii* (Graham) Briq.

Shrub, the stout branches with gray sometimes exfoliating bark, the often many crowded or sometimes lax branchlets lustrous brown, early hispidulous; leaves commonly oblong, entire, rounded or obtuse both ends or minutely decurrent into the short petiole, often narrower than 4 mm. and usually about twice as long, sometimes to 2 cm. long, minutely puberulent; flowers usually solitary, sometimes several, the pedicels about 1 mm. long; calyx tube 1–1.5 mm. long, pubescent as leaves, the ovate acute lobes about 0.6 mm. long; corolla tube 1.2–1.4 mm. long; nutlets oblong-obovoid, 1.5–1.7 mm. long, sometimes subacute.

Arequipa: Above Chivay, *Weberbauer 6891*. At about 4,000 meters, *Meyen*. To Argentina.

Satureja plicatula Epl. Ann. Mo. Bot. Gard. 14: 69. 1927; 54.

Lax or diffuse minutely puberulent shrub; leaves subsessile, serrulate, ovate, acute, 3–5 mm. long, notably striate (plicately) nerved beneath; pedicels solitary, 2–2.5 mm. long; calyx tube hirtellous, 4.5 mm. long, the upper deltoid teeth 0.5–0.8 mm. long, the throat hirsute; corolla red, the tube 20–22 mm. long, pilose within, the subequal lip about 4–4.5 mm. long; stamens at middle of tube.—Collection was mixed with *S. argentea* (HBK.) Briq. in small part, and type (pendent from river cliff ledges) cited by author as *2238A;* the actual type is in Chicago as *2238*.

Huánuco: Llata, *2238*, type.

Satureja pulchella (HBK.) Briq. Naturl. Pflanzenfam. 4, Abt. 3a: 300. 1897; 50. *Gardoquia pulchella* HBK. Nov. Gen. & Sp. 2: 315. 1818; 237. *G. tomentosa* HBK. l.c. 314, at least as to Peru. *S. tomentosa* (HBK.) Briq. Naturl. Pflanzenfam. 4, Abt. 3a: 300. 1897; 52.

Shrub with slender ascending crisply puberulent branchlets, the internodes in type about 4 cm. long; petioles 2–5 mm. long; leaves

rhomboid-ovate, shortly narrowed at base, obtuse or obtusely apiculate, closely but clearly crenate, 2–4 cm. long, about half as wide, green but hispidulous above, white tomentose beneath; flowers few in the upper axils, the bractlets 3–6 mm. long; calyx tube puberulent, 6–7 mm. long, the subulate-setaceous teeth to about 4 mm. long; corolla tube 2 cm. long, the upper lip 5 mm. long.—Flowers a pale salmon-orange, a tea from the leaves used for colds (West). F.M. Neg. 17687.

Cajamarca: Contumaza, *Bonpland*, type.—La Libertad: Pataz, *Raimondi*. Huamachuco, *West 8092*.—Ancash: Pomabamba, *Raimondi*. "Panisara" (West).

Satureja revoluta (R. & P.) Briq. Naturl. Pflanzenfam. 4, Abt. 3a: 300. 1897; 55. *Gardoquia revoluta* R. & P. Syst. Veg. 149. 1798; 239. *S. insignis* Mansf. Notizbl. Bot. Gard. Berlin 9: 288. 1925, fide Epling.

Procumbent or low shrub developing innumerable almost filiform branchlets at intervals on apex of the flexuose branches; petioles about 1 mm. long; leaves crowded, entire, strongly revolute, deltoid-ovate, 2–3 mm. long and nearly as wide, truncate at base, obtuse, green above, tomentulose beneath; pedicels solitary, 3–4 mm. long; calyx puberulent, the tube 3.5–4 mm. long, the upper teeth about 1 mm. long, subacute; corolla red, about 2 cm. long or somewhat longer.—F.M. Neg. 29119.

Piura: Huancabamba to Ayavaca, *Weberbauer 6333* (type, *S. insignis*).—Lima: Yangas, *Raimondi* (det. Dahlem, *S. insignis*). San Mateo, *Isern*. Canta, *Née*.—Huánuco: Panao, *Ruiz & Pavón*.—Junín: La Oroya, *Kalenborn 162*. Huariaca and Huassihuassi, *Ruiz & Pavón*, type.

Satureja rugosa (Benth.) Briq. Naturl. Pflanzenfam. 4, Abt. 3a: 300. 1897; 51. *Gardoquia rugosa* Benth. Lab. Gen. & Sp. 399. 1834; 236.

Younger branchlets and leaves coriaceous or thick, more or less villous, the latter early densely so beneath; petioles 3–8 mm. long; leaves serrate, ovate or rhomboid-rotund, often shortly decurrent at the rounded base, rounded or sometimes slightly narrowed to obtuse tip, 1.5–3.5 cm. long, about as wide; flowers few in dense axillary cymules; calyx tube roughly hispidulous, 4.5–5.5 mm. long, the lobes 2.5 mm. long; teeth lanceolate-subulate, acute, the posterior medially connate; corolla tube 1–1.5 cm. long, the upper lip 3–3.5 mm. long,

subentire, the lower nearly as long.—Flowers red. Type by [Ruiz] and Pavón, without locality and less villous than Redoutt's but calyx, leaves, habit similar; known as "Panicera" and used as a medicinal herb (Epling). F.M. Neg. 29120.

Huánuco: Near Huánuco, *2084* (distr. as *S. tomentosa*).—Cajamarca: Prov. Celendín, 1860 meters, (*Redoutt 04760*).

Satureja Ruizii Macbr., nom. nov. *Gardoquia obovata* R. & P. Syst. Veg. 150. 1798. *S. obovata* (R. & P.) Briq. Naturl. Pflanzenfam. 4, Abt. 3a: 300. 1897, not Lag.

Apparently similar to *S. Mathewsii* but leaves oblanceolate, long-attenuate to distinct petiole, revolute, 5–6 mm. wide, about twice as long, canescent tomentulose beneath, glabrate above; calyx pubescent at base; corolla glabrous within.—Ex char. not the same as *S. guamaniensis*, or variable.—F.M. Neg. 29117.

Lima: Cheuchin, *Ruiz & Pavón*, (*Dombey*), type.—Cuzco: Paucartambo, 3200 meters, (*Woytkowski 588*, det. Epling).

Satureja sericea (Presl) Briq. Naturl. Pflanzenfam. 4, Abt. 3a: 300. 1897; 55. *Gardoquia sericea* Presl ex Benth. Lab. Gen. & Sp. 402. 1834; 238.

A closely or strictly branched shrub, low or sometimes a meter or so high with glabrate branches but many canescent sericeous subsessile tightly revolute linear leaves or the older lanceolate, 5–12 mm. long; pedicels 1–2 mm. long, usually 3; calyx tube sericeous, 4–4.5 mm. long, the teeth deltoid, the lower 1.5 mm. long; corolla red, the tube 15–18 mm. long, the lobes subequal, 3.5–4 mm. long; stamens above the middle.—F.M. Neg. 8298.

Amazonas: Chachapoyas, *Mathews; Williams 7548*.—Huánuco: Yanahuanca, *1272*. Llata, *2243*. Chasqui, *1765*. Near Huánuco(?), *Haenke*, type.—La Libertad: Prov. Otuzco, (*López 1045*). Cerro La Botica (*Angulo 1670*). "Chunmis," "chinchi."

Satureja sphenophylla Epl. Repert. Sp. Nov. Beih. 85: 152. 1936; 51.

A fragrant shrub attaining a meter or more, the indument crisply hirtellous but not cinereous; leaves serrulate, narrowly rhomboid-ovate, cuneately narrowed to petiole—this 3–6 mm. long—obtuse, 3–6 cm. long, about a third as wide; cymules about 15-flowered, shortly peduncled in the upper axils; pedicels 1–1.5 mm. long;

calyx tube sparsely hirtellous, 3.5–4 mm. long, the teeth subequal, subulate, very acute, the upper 4 mm. long; corolla pale, the tube pubescent within, 8 mm. long; stamens at the throat; nutlets lanceolate, nearly 3 mm. long.

Junín: Carpapata near Huacapistana, 3,000 meters, *Killip & Smith 24443*, type.

Satureja striata (R. & P.) Briq. Naturl. Pflanzenfam. 4, Abt. 3a: 300. 1897; 54. *Gardoquia striata* R. & P. Syst. Veg. 148. 1798; 238.

A slender virgate glabrous (unless the short branchlets) shrub distinctive by the many usually strongly imbricate sessile ovate leaves that are notably striate-nerved beneath; leaves rounded at base, entire, 2–6 mm. long, lustrous above; pedicels solitary, slender, about 2 mm. long; calyx tube costate, 4.5–5 mm. long, the teeth obtuse, the lower deltoid-ovate, about 1 mm. long; corolla tube 2 cm. long, upper lobe 5–6.5 mm. long, lower 3.5–4 mm. long; stamens medial.—Flowers orange-yellow, a 1–2 meter shrub, often with few if any branches. F.M. Neg. 29121.

Huánuco: Pillao, 2,700 meters, *Woytkowski 34130* (det. Cuatrecasas). Near Huánuco, *Ruiz & Pavón*, type. Mito, *1734*. Panao, *2213*. Chaglla, *Weberbauer 6688*. "Socconcha," "pichuisa" (Ruiz & Pavón).

Satureja vana Epl. Ann. Mo. Bot. Gard. 14: 79. 1927; 57.

Type a rather open shrub about 2 meters tall, the younger branchlets as the leaves and calyces minutely and somewhat cinereously puberulent; leaves subsessile, entire or obscurely subserrulate, rotund or ovate-rotund, often about a cm. long; flowers subsessile, 1–6 in most of the upper axils, white to pale lilac; calyx tube 2–2.5 mm. long, the ovate acute subequal teeth 1–1.2 mm. long, the throat only slightly hirsutulous; corolla tube pubescent within, 6 mm. long; stamens at the throat.—Combines characters of sections *Gardoquia* and *Xenopoma* (author).

Moquegua: Carumas, 3,000 meters, *Weberbauer 7259*, type.

Satureja Vargasii Epl. & Math. Brittonia 8: 304. 1957.

Shrub to 8 dm. high, the branches as leaves beneath minutely hirtellous, the latter ovate or oval, obtuse, narrowed to petioles 2–3 mm. long, entire, glabrous and opaque above, paler beneath, 10–14 mm. long; flowers 3–6 in leaf axils; calyx about 1 cm. long, the hirtellous tube nearly straight, 3 posterior teeth connate, 0.5 mm.

long, the anterior 1 mm. long, acute, the throat shortly and sparsely hirsute within; corolla tube lightly arcuate, 22 mm. long.—Section *Gardoquia* (author), the type (not seen) at Univ. of Calif. Herbarium at Los Angeles; species characteristics within the genus seem, as given, to be tenuous.

Cuzco: In woods near Chollambamba, Paucartambo, 2600 meters, (*Vargas 9472*, type).

Satureja Weberbaueri Mansf. Notizbl. Bot. Gart. Berlin 9: 285. 1925; 50.

Slenderly branched shrub minutely hirtellous or puberulent, not canescent; petioles 1 mm. long; leaves oblong-elliptic, revolute, about equally narrowed both ends, subacute, 7–12 mm. long, 3–4 mm. wide; pedicels 1–3 in axils, about 1 mm. long; calyx tube about 5 mm. long, the teeth deltoid or ovate, acute, the upper 0.5–0.8 mm. long, the lower 1–1.2 mm. long; corolla purple, the tube about 13 mm. long, gradually ampliate, the lips about 2.5 mm. long.

La Libertad: Santiago de Chuca, 3,000 meters, *Weberbauer 7016*, type.

8. SPHACELE Benth.

Lepechinia Willd. Hort. Berol. 1: 21, *pl. 21*. 1806.

Reference: Epling, Ann. Mo. Bot. Gard. 13: 35–70. 1926; Brittonia 6: 352–364. 1948.

Stature varying from low perennials more or less ligneous toward base to shrubs or even small trees, the particularly diagnostic characters being the reticulate-venose soon accrescent calyx, the corolla tube annulate or shortly pilose within, and the more general, shared with similar groups, fertile stamens 4, little or not exserted, the connective not deltoid.—A reference number not applicable to Epling's work refers to Bentham's in DC. Prodromus. Bentham's name was conserved but without reference to Willdenow's, which practically ought to make no difference in acceptance of the name. Epling's 1948 work includes a diagram visualizing species relationships by groups, distributional maps, thoughtfully defined sectional descriptions as well as comments.

KEY TO SPHACELE

Perennial herb; flowers glomerulate, foliose-bracted, the glomerules sometimes spicate ..... *S. Meyeni.*

Suffrutescent or arborescent; flowers paniculate or rarely solitary.

Flowers solitary in axils; leaves less than 1 cm. wide. *L. marica, S. tomentosa.*

Flowers 3 or more in verticils; leaves larger.

Verticils rather openly panicled; corolla tube 8–many mm. long.

Leaves pubescent; corolla well-exserted.

Corolla tube 1.5–3 cm. long; calyx teeth finally 7–8 mm.; leaves often rugose..... *S. lamiifolia.*

Corolla tube to 1.5 cm. long; calyx teeth to 5 mm. long; leaves smooth or nearly..... *S. floribunda.*

Leaves glabrous; corolla tube little exserted..... *S. codon.*

Verticils at least in fruit mostly or all congested (open in flower in *S. vesciculosa*); corolla tube 2–4 mm. long.

Leaves attenuate to base.

Leaves more attenuate to base than to acute apex, to 1.5 cm. wide..... *S. mollis.*

Leaves equally attenuate to base and apex or more so to tip..... *S. vesciculosa.*

Leaves rounded to slightly decurrent at base.... *S. conferta.*

Leaves basally rounded-truncate or truncate-cordate.

Calyx teeth acute, 1.5 mm. long; corolla tube 2–2.5 mm. long..... *S. radula.*

Calyx teeth acutely acuminate, 2–2.5 mm. long; corolla tube 3.5–4 mm. long..... *L. scobina.*

Sphacele codon (Epl.) Macbr., comb. nov. *Lepechinia codon* Epl. Repert. Sp. Nov. Beih. 85: 23. 1935; 11.

Glabrous shrub; petioles about 1 cm. long; leaves serrulate, elliptic-lanceolate, acute or slightly acuminate, rounded at base, 10–18 cm. long, 2.5–5 cm. wide, reticulate-venose; flowers 1–3 in axils of setaceous bracts, 5–7 mm. long in slender panicles; calyx early 2.5–4 mm. long, equaled by the setaceous teeth, these deltoid-acuminate in fruit, half as long as the fruiting calyx, this 9 mm. long; pedicels 1–2 mm. long; corolla 8 mm. long, the segments 1.5 mm. long; stamens scarcely exserted, the subannulate nectary 2.5 mm. above the base; nutlets 2 mm. long.—Attains 4 meters, dull indigo blue flower (West). Curiously, the author, l.c., does not indicate that he referred the type, in his revision, to *S. lancifolia* (Rusby) Epl. Ann. Mo. Bot. Gard. 13: 48. 1926, of Bolivia, which ex char. (Epling, l.c.)

has crenate leaves, 3-flowered verticils, lanceolate bracts, pedicels 2–3 mm. long, calyx teeth unchanged in fruit, 7–8 mm. long, tube 8 mm. long, corolla 12 mm. long, lobes 2 mm. long.

Cuzco: Near San Miguel, Urubamba, 1,800 meters, (*Cook & Gilbert 1144*, type). Ruins of Machu-picchu, *West 6418*.

Sphacele conferta Benth. Pl. Hartw. 244. 1846. *Lepechinia conferta* (Benth.) Epl. Repert. Sp. Nov. Beih. 85: 25. 1935. *S. heteromorpha* Briq. Bull. Herb. Boiss. Sci. 1, 4: 847. 1896. *L. heteromorpha* (Briq.) Epl. l.c. 26; 12; pretty clearly the same, Mathias & Epling, Brittonia 8: 303. 1957.

Branchlets soon glabrate, the petioles (2–4 cm. long), ample panicles and leaves beneath somewhat scurfy tomentulose; leaves serrulate, oblong-ovate, 1–2 dm. long, 5–8 cm. wide, rounded to slightly decurrent at base, acute to acuminate, finally glabrous and lightly rugulose above, verticils congested, bracts ovate, often longer than flowers; calyx turbinate, the tube 2–2.5 mm. long, in fruit 4–5 mm. long, inflated but scarcely tumid or the deltoid acute teeth changed, 0.6–1 mm. long; corolla tube 2.5–3 mm. long; stamens medial, included.—May prove to be a part of *S. vesciculosa* (Benth.) Macbr. Shrub or small tree to 4 meters tall with rounded crown, white flowers.

Huánuco: Huamachuco, Río Marañón, 25–3500 meters, (*N. Ibanez 1575*).—Piura: Ayavaca, *Soukup 4304* (det. M. & E.).—Ayacucho: Huanta, *Weberbauer 7548*.—Cuzco: Marcapata, *Weberbauer 7812*.—Puno: Near Tabina(?), *Lechler 1970*. Bolivia; Ecuador.

Sphacele floribunda Benth. in DC. Prodr. 12: 254. 1844; 254. *Lepechinia floribunda* (Benth.) Epl. Repert. Sp. Nov. Beih. 85: 22. 1935; 10.

Suffrutescent, more or less floccose villous, to several dm. high; petioles 1–2.5 cm. long; leaves crenate, deltoid-ovate, acute, the base truncate-hastate, 4–12 cm. long or longer, 2.5–7 cm. wide, scabrellous above; flowers in axils of subfoliose bracts on paniculate branchlets; calyx shortly pubescent, the tube early 4–5 mm. long, the teeth setaceous, 2.5–5 mm. long, the tube finally twice as long; pedicels 3–7 mm. long; corolla 10–14 mm. long, the segments 1 mm. long, the tube constricted at annulus, this 3 mm. above base; stamens medial; nutlets 2.5 mm. long.—Branches shortly hirsute, leaves scabrous puberulent above, shortly villosulous beneath, affine *S. lamiifolia* Benth. but less villous, leaves less rugose, often hastate, and corolla

tube ampliate medially (Bentham); hardly separable from *S. Hieronymi* Briq. of Argentina but larger in leaves and flowers (Epling on *Weberbauer 7616*).

Huancavelica: La Mejorada, 2,800 meters, *Weberbauer 7616; Stork & Horton 10894* (det. Standley).—Cuzco: Río Acobambilla, *Goodspeed Exped. 10894*. Ollantaitambo, *Herrera 3453*. Calca, (*López 0608*). To Argentina.

Sphacele lamiifolia Benth. Lab. Gen. & Sp. 570. 1834; 254. *Lepechinia lamiifolia* (Benth.) Epl. Repert. Sp. Nov. Beih. 85: 21. 1935.

Shrub, the bark exfoliating, the branchlets tomentose or floccose-lanate as the leaves beneath; petioles 1–1.5 cm. long; leaves ovate-deltoid, unevenly crenate, obtuse or subacute, truncate-cordate or subsagittate at base, 8–11 cm. long, 3–8 cm. wide, bullate and scabrous hispidulous above; flowers in axils of reduced sessile leaves in lax villous panicles; calyx 6–7 mm. long, purple, finally twice as long, chartaceous, the teeth 7–8 mm. long, the deltoid base 3–6 mm. wide, setaceous acuminate, rigid, spreading; corolla red-purple, 1.5–3 cm. long, throat 5–7 mm. broad, lower segments 3 mm. long; stamens didymous, at the throat; nectary annulate, pubescent, 1 mm. above base; nutlets 3 mm. long.—Leaves glandular beneath, corolla tube slender (Bentham). To 2 meters tall; calyx green with purple ridges, corolla dark blue; stem ligneous (Stork & Horton).

Cajamarca: Contumaca, *Raimondi*.—Ancash: Chiquian, (*Ferreyra 7536*).—Amazonas: Chachapoyas, *Mathews 2183*.—San Martín: *Raimondi*.—Lima: *Dombey 283*, type. Chorillos, *Raimondi*. San Buenaventura, *Pennell 14537*. Matucana, *178*. Near Viso, *Weberbauer 5214*.—Junín: Palca, *Raimondi*.—Apurímac: Chincheros, *Stork & Horton 10762*.—Arequipa: *Raimondi*.

Lepechinia marica Epl. & Math. Brittonia 8: 305. 1957.

Shrub or shrubby, probably taller than one meter, more or less lignescent; leaves as bractlets minutely and sparsely puberulent; flowers often (?) solitary in axils of the smaller leaves; calyx tube in flowers 2.5–3 mm. long, little longer in fruit, the subequal teeth about 3 mm. long; corolla tube cylindric, 5 mm. long, included or little longer than calyx lobes especially the shorter; areolas 2 under the upper lip; stamens included; mature nutlets black, 2 mm. long. —*Campanulatae;* number 37a in key of Epling, l.c. 6: 354. 1948.

La Libertad: El Granero, Prov. Otuzco, 2900 meters, (*López M. 0601*, type, U.C.L.A.).

Sphacele Meyeni (Walp.) Macbr., comb. nov. *Lepechinia Meyeni* (Walp.) Epl. Repert. Sp. Nov. Beih. 85: 20. 1935; 8. *Stachys Meyeni* Walp. Nov. Act. Nat. Cur. 19, suppl. 1, 375. 1843; 479. *S. tenuiflora* Benth. in DC. Prodr. 12: 257. 1848, fide Epling.

Procumbent-ascending from ligneous caudex, 2–4 dm. high; petioles margined, 3–6 mm. long; leaves crenate, mostly ovate, obtuse, rounded at base, 2–5 cm. long, 1–4 cm. wide, rugose and finely hirtellous above, puberulent beneath; flowers in foliose (3–6 flowered) glomerules or often oblong and congested; calyx tube 1.5 mm. long, pubescent and yellow-glandular, the lobes as long, teeth narrowly deltoid, lower 2 connate more than medially, the tube finally 4 mm. long, acute teeth little accrescent; corolla tube 3.5–4.5 mm. long; nectary basal, subannulate; stamens above middle of tube; nutlets about 2 mm. long.—Leaves canescent beneath. Pungent odor delightful; flowers bluish; used as a medicinal tea (Metcalf).

Huánuco: Pillao, *Woytkowski 42; 34042*; also *817, 914* at Chavanillo.—Junín: Huancayo, *Soukup 2767*.—Huancavelica: Río Acobambilla, 3200 meters, *Stork & Horton 10868*. Near Cordova, *Metcalf 30265*.—Cuzco: Pucaro, *Weberbauer 428*. Marcapata, *Weberbauer 7809*. Prov. Canas, *Vargas 9847*. Ollantaitambo, (*Cook & Gilbert 801; 1899*).—Puno: Pisacoma, *Meyen*, type. Arranca, *Pennell 13450*. Chuquibambilla, *Pennell 13384*. To Argentina.

Sphacele mollis Epl. Ann. Mo. Bot. Gard. 13: 64. 1926. *Lepechinia mollis* Epl. Repert. Sp. Nov. Beih. 85: 27. 1935; 13.

Slender flowering branchlets, leaves beneath and calyces cinereous puberulent-tomentulose; petioles about 5 mm. long; leaves subentire, nearly oblong, mostly rather longer attenuate to base than to acute or subacute apex, 3–8 cm. long, 0.5–1.5 cm. wide, glabrate above; ovate acute bracts little longer than flowers, the dense verticils 5–10 mm. distant; calyx tube scarcely 1.5 mm. long, finally 3–3.5 mm. long, the deltoid teeth 0.5–0.7 mm. long, in fruit about 1 mm. long; corolla tube at most 2 mm. long; nutlets black, shortly obovoid, 1.2 mm. long.—*S. mutica* Benth. of Ecuador, which simulates this species, has broader (1–2 cm. wide) crenulate leaves, corolla tube 2.5–2.8 mm. long, nutlets 1.5 mm. long (Epling); perhaps *Raimondi 502* from Cajamarca referred to it in Herb. Dahlem was rather this species.

Lambayeque: Near Olmos, 1,900 meters, *Weberbauer 7106*, type.

Sphacele radula Benth. in DC. Prodr. 12: 257. 1848. *Lepechinia radula* (Benth.) Epl. Repert. Sp. Nov. Beih. 85: 27. 1935; 13. *S. cordifolia* Benth. l.c., fide Epling.

Branches as leaves beneath lanate, the latter strongly bullate-rugose and hirtellous-asperous or glabrate above, ovate-oblong, subobtuse, more or less cordate at base, often 5–10 cm. long, 3–6 cm. wide, or larger; petioles somewhat alate, 1–1.5 cm. long; racemes more or less paniculate, the verticils usually approximate, the subrotund bracts about as long; calyx villous in type, the lanceolate teeth acute, slightly shorter than tube, this about 2 mm. long or finally nearly 3 mm. long, the teeth little changed, the calyx thus in fruit about 6 mm. long; corolla 4 mm. long, the medial affixed stamens scarcely exserted; nutlets 1.5 mm. long.—Corolla white; leaves bicolored; in his revision Epling, l.c. 60, referred my collection with query to *S. conferta* Benth. of Colombia with leaves truncate-subsagittate at base, later to *S. bullata* (HBK.) Benth.; see note under *L. scobina* Epl.; recently he has named *López 1437* with query (La Libertad) *L. bullata;* the several forms here seem to merge; *N. Ibáñez 1575* from Huamachuco on Río Marañón, is *L. conferta* fide Epling.

Piura: Ayavaca, *Weberbauer 6368*.—Amazonas: Chachapoyas, *Mathews*, type (also *1534;* type, *S. cordifolia*).—Huánuco: Panao, *3575*.—Huancavelica: Surcubamba, 2,600 meters, *Stork & Horton 10355* (det. Standley, *S. bullata*).

Lepechinia scobina Epl. Repert. Sp. Nov. Beih. 85: 26. 1935; 12.

Character in general that of *S. radula* Benth.; petioles 1 cm. long; leaves 5–10 cm. long, 3–5 cm. wide; calyx tube in flower 1.5 mm. long; calyx teeth deltoid, often acutely acuminate, about 1 mm. long, in fruit nearly unchanged, the tube then 2.5 mm. long, inflated, scarcely tumid; corolla tube 2–2.5 mm. long; nutlets brownish, nearly 2 mm. long.—Here probably would be sought ex original char. *S. bullata* (HBK.) Benth., 568, with larger acutely acuminate leaves, calyx tube in flower 2.5 mm. long, teeth ovate-acuminate (subulate-acuminate, HBK.), 1.5 mm. long, fruiting calyx 6–7 mm. long, gland-dotted (Epling, 21), collected as near as the Putumayo Basin area and it seems possible that a single somewhat variable species is concerned, including *S. radula* Benth.; see note under *S. vesciculosa* (Benth.) Macbr.

Cajamarca: Cutervo, *Jelski 73*, type; *Raimondi*. Nanchó, *Raimondi*. Chota, *Raimondi*.

Sphacele tomentosa Benth. Lab. Gen. & Sp. 569. 1834; 256. *Lepechinia tomentosa* (Benth.) Epl. Repert. Sp. Nov. Beih. 85: 19. 1935; 8.

Diffuse, more or less ligneous, several dm. high, the few glabrous stems ascending, the tomentose branchlets obtusely quadrate; petioles to 2 cm. long; leaves crenulate, oblong-obtuse, truncate-subhastate at base, 1–2.5 cm. long, 6–8 mm. wide, green but hispidulous above, rugulose, shortly white tomentose beneath; flowers solitary in the upper axils, the subtubular calyx 5 mm. long, bilabiate, the acute or acuminate teeth little shorter than the tube, this finally 5–6 mm. long, the 3 upper teeth deltoid, the lower about 4 mm. long, with rounded sinus; corolla tube 3.5 mm. long; nectary interrupted, pubescent upper lip 1.5 mm. long, emarginate, lower 3 mm. long, the twice as large middle tooth rounded; stamens medial.—Leaves tomentose both sides, irregularly and deeply crenate, strongly rugose (Bentham).

Lima: Cheuchin, *Dombey*, type. Near Canta, 3,500 meters, *Pennell 14639*.

Sphacele vesciculosa (Benth.) Macbr., comb. nov. *Lepechinia vesciculosa* (Benth.) Epl. Repert. Sp. Nov. Beih. 85: 24. 1935; 11. *Hyptis vesciculosa* Benth. Lab. Gen. & Sp. 131. 1833; 130.

Branchlets finely ferrugineous tomentose, the crenulate oblong-elliptic leaves canescent tomentose beneath, glabrous or rugose above, cuneate at base, acute or shortly acuminate, about 1–2 dm. long, 3–6 cm. wide; verticils approximate, racemosely paniculate, bracts small; flowering calyx campanulate, shortly villous, the tube about 2 mm. long, deltoid-acuminate (setaceous, Bentham), the teeth scarcely half as long, the calyx in fruit membranous, reticulate-venose, inflated, the teeth unchanged but the subglobose tube about 5 mm. long; corolla tube nearly glabrous within, 2.5–3 mm. long; stamens in throat, subexserted; nutlets 1.5 mm. long.—Type by Tafalla, no data, but Guayaquil, fide Bentham, which seems doubtful from known range; Tafalla was also in southern Peru; however, the similar *S. bullata* (HBK.) Benth., 257 and 568, has been found in the Putumayo region but according to original description resembles more nearly *S. radula* Benth. and *L. scobina* Epl. in leaf-form, but calyces little or not tumid in age, however 6–7 mm. long; Epling, 21, decided the type consisted of two species, *S. parviflora* Benth. and *S. conferta* Benth., and based the species on the former with attenuate leaves. *Soukup 441* incorrectly labeled "Puno" (Killip). The

Pennell collection has much more open inflorescence, larger flowers, less pubescence (Epling).

Cuzco: Machu-picchu, *Soukup 141; Vargas 521.* Arro de Cusilluyoc, *Pennell 14082.*—Puno: Limbani area, *Metcalf 30554; 30584.* Sandía, *Weberbauer 523.* Bolivia?

9. HEDEOMA Pers.

In Peru a ligneous-based perennial. Leaves subrotund, subentire. Peduncles 1–few in the upper axils. The calyx about 13-striate, the throat pubescent, the upper lip 3-dentate, the lower 2-cleft. Erect upper lip of the small corolla plane, emarginate, the spreading lower lip 3-lobed. Fertile stamens 2-ascending.—Low fragrant herbs, the pennyroyal of English-speaking people.

Hedeoma Mandoniana Wedd. Chlor. And. 2: 148. 1860; 46

Low fragrant more or less hispidulous perennial, the ascending branches from a ligneous caudex, the subligneous subdecurrent stems rooting; petioles scarcely 1 mm. long; leaves rounded-ovate, truncate-subcordate or somewhat narrowed at base, subobtuse, 3–5 mm. wide and long, obscurely if at all crenate; pedicels 1–3 in upper axils, 2–3 mm. long; calyx tube 3–3.5 mm. long, the upper lip about 1.5 mm. high, the teeth narrowly deltoid, acute, the lower teeth 1.5–2 mm. long, these, especially, more or less ciliate, the throat hirsute within; corolla tube 3–4.5 mm. long; nutlets ovoid, 7–8 mm. long. —F.M. Neg. 17699 (*Lechler 1745* under an ined. name).

Junín: La Oroya, *980; Kalenborn 22.*—Cuzco: Paruro, *Vargas 887.* Grass steppe, Andres de Checca, *Vargas 11015* (det. Standley).—Puno: Azangaro, *Lechler 1745.* Agapata, *Lechler 1848.* Panticalla Pass, 3,600 meters, (*Cook & Gilbert 1816*). Araranca, 4,100 meters, *Pennell 13434.* Bolivia.

10. SALVIA L.

References: Epling, Repert. Sp. Nov. Beih. 105: 14–46. 1938; 110: 1938–1939.

Various in habit and duration but particularly distinctive by staminal character: fertile stamens 2, parallel-ascending under upper lip, included or sometimes long-exserted, the remotely placed linear anthers 1-celled by abortion, the filament (relatively short) terminating into an exaggerated connective, joined medially or near one end, the connective at upper end perfectly antheriferous, at the basal end the anther cell more or less (to obsolete) reduced; connec-

tive below is sometimes dilated or (and) projects as a tooth. Flowers rarely axillary, usually in interrupted spikes, less frequently in racemes; upper calyx lip entire or 3-mucronate, 3–9-veined; corolla tube smooth, papillate or transversely rugose (rarely) within, the erect upper lip more or less galeate, the medial lip of the trifid lower sometimes emarginate. Style glabrous or more or less villous, rarely hirtellous.

The following account is, of course, compiled with few additions but some reduction from Epling's conscientious work; his key to sections—this term used in expediency, following Epling, l.c. 110 (to which the second reference numbers refer), although it will apply better when the species groups are defined more broadly—is from his synopsis of the South American species, l.c. 85: 28–32. 1935; his species key from l.c. 105: 14–18. 1938; for convenience a supplementary key, more completely based than his on vegetative characters, now and then the only ones available, is appended, but naturally it is sometimes only suggestive.

The monographer, l.c. 110: 2, listed his criteria for the species—groups or sections based on number of flowers in glomerules, relative bract-persistence, number of calyx veins in upper lip, proportion of upper corolla lip to lower, corolla smooth or not within, tube entire or invaginate, proportionate stamen-length and attachment in reference to throat, nature of stamen connective, especially lower sterile part, and style branches.

Species omitted include the casual escapes *S. splendens* Sellow (*Vargas 2072*, det. Standley, from Machu-picchu) and *S. verbenacea* L. (Prov. del Cercado, Cuzco, *Herrera* with native name "asnac-ccora," and at Estac. Exp. Kaira, *Vargas* as "cancer ccora"); the latter is a perennial with unevenly lobulate leaves, unlike any Peruvian species. Unidentified names proposed for Peruvian plants include *S. galeata* R. & P. Fl. Peruv. 1: 27, *pl. 42*. 1798, and *S. violacea* l.c. 26, *pl. 43*, the former from Muña, the latter from Tarma, and specimens not seen.

KEY TO SALVIA

(Key to sections, after Epling, with some staminal distinctions from sectional descriptions)

Stamens well exserted.

Style rarely not entirely glabrous; corolla tube not papillate within (Peru) but pubescent in one species of *Cylindriflorae* (*S. praeclara*).

Flowers solitary in opposite racemose verticils.

Tube of red corolla only arcuate; upper calyx lip entire; stamens at middle of tube, gubernaculum entire... *Biflorae.*

Tube of dark blue (rarely roseate or pale), corolla flexuose; upper calyx lip truncate-rounded, obscurely 3-mucronate; stamens at middle of tube, connective jointed at base, gubernaculum dilated below middle..... *Hastatae.*

Flowers 2–6 (or more) in spicate verticils.

Annual herbs; corolla tube 4–6 mm. long..... *Rhombifoliae.*

Perennial herbs or shrubs; corolla tube 1–5 cm. long.

Corolla dark blue, rarely nearly white.

Corolla tube straight; stamen connective jointed at base, elongate above, the gubernaculum subentire. *Macrostachyae.*

Corolla tube arcuate-flexuose; stamen connective jointed at middle, gubernaculum entire..... *Siphonanthae.*

Corolla red or reddish.

Andean plants; stamens above middle of tube; style glabrous..... *Cylindriflorae.*

Eastern (as Brazil) or cosmopolitan; as above but style sometimes hirtellous..... *Subrotundae.*

Style villous.

Corolla limb papillate within..... *Flexuosae.*

Corolla smooth within.

Upper calyx lip to 3-veined; stamens at throat, connective to 4 cm. long, jointed above middle, gubernaculum 2.5 cm. long..... *Floridae.*

Upper calyx lip 5–7-veined..... *Subrotundae.*

Stamens included in the upper lip.

Trichomes branched (see *S. Herrerae*, of *Secundae?*).

Corolla tube binate-papillate within; connective medially geniculate, gubernaculum dilated into an acute tooth; style glabrous..... *Pavonianae.*

Corolla tube smooth within.

Connective gubernaculum at middle retrorsely extended. *Flocculosae.*

Connective gubernaculum with a tooth extended upward, rarely subentire; style pilose or glabrous.... *Tomentellae.*

Trichomes (if present) simple.

Connective gubernaculum more or less dilated into a forward tooth; upper calyx lip obscurely 3-mucronate.

Style glabrous.....*Microsphace.*

Style villous dorsally.

Corolla tube ventricose (at base); leaves rugose.

Corrugatae.

Corolla tube not ventricose; leaves rather smooth.

Punctatae.

Connective dilation (gubernaculum) entire or retrorsely dentate; upper calyx lip entire.

Upper calyx lip 3-veined; gubernaculum dilated into a retrorse tooth.....*Angulatae.*

Upper calyx lip 5–9-veined.

Corolla tube binately papillate within.

Flowers axillary; style pilose.....*Leonuroideae.*

Flowers in interrupted spikes; style glabrous.

Umbratiles.

Corolla tube smooth within.

Lower lip shorter than or subequaling upper; corolla mostly large, red; gubernaculum entire or obscurely toothed.

Style glabrous except *S. Weberbaueri.*

Weberbaueria (sic), *Longiflorae.*

Style somewhat villous; connective jointed..*Secundae.*

Lower lip clearly longer than upper; corolla usually small, blue.

Style villous.

Leaves entire, 1–3 cm. long.....*Sarmentosae.*

Leaves serrate, larger; gubernaculum dilated into a retrorse tooth.....*Angulatae.*

Style glabrous.

Corolla tube exserted, to 1 cm. long; leaves serrate.

Posterior style branch shorter than anterior, sometimes obsolete; stamens shortly exserted at throat, connective joint medial or lower, gubernaculum usually dilated into a small tooth.

Rhombifoliae.

Posterior style branch clearly larger.
Microsphace.
Corolla tube included, 13–15 mm. long; leaves entire.
Discolores.

SPECIES KEY (from Epling)

(Several species described since Epling's work, not fully known to me, are omitted, viz. *S. camporum, S. consobrina, S. incurvata, S. innoxia, S. pseudorosmarinus, S. trifilis*)

Stamens exserted from upper lobe.
Flowers opposite in racemes; cf. *S. flocculosa.*
Corolla blue.
Procumbent herb rooting at lower nodes. . . *S. scutellarioides.*
Erect herb with few strict stems.
Leaves hastate, subcoriaceous; stamens about 3 cm. long.
S. rhodostephana, S. sagittata.
Leaves deltoid or ovate, membranous; stamens 2.5 cm. long.
S. macrophylla.
Corolla red or roseate.
Leaves sagittate, 7–10 cm. long. . . . . *S. rhodostephana.*
Leaves not sagittate, 2–6 cm. long.
Leaves glabrous or nearly. . . . . *S. oppositiflora.*
Leaves softly pubescent beneath.
Leaves rounded at base, mostly less than 2.5 cm. wide.
S. striata.
Leaves cordate, mostly 2.5–5.5 cm. wide. . . . *S. tubiflora.*
Flowers 3–6 or more (rarely solitary) in spicate verticils.
Corolla dark blue, sometimes rather white.
Perennial, the leaves 5–20 cm. long.
Corolla nearly white, the tube 1 cm. long. . . *S. psilostachya.*
Corolla dark blue, the tube 1.5–2 cm. long.
Lobes of mature calyx equal. . . . . *S. alata, S. speciosa.*
Upper lobe of mature calyx shorter than lower.
S. atrocalyx.
Annual, the leaves 3–6 cm. long.
Style glabrous.
Calyces glandular, finally 8–12 mm. long; plant somewhat glandular-hispid. . . . . *S. rhombifolia.*

Calyces eglandular, to 7 mm. long; plant subglabrous. *S. paposana.*

Style villous..... *S. tiliaefolia.*

Corolla red.

Corolla tube binate-papillate within at base.. *S. pauciserrata.*

Corolla tube smooth within.

Corolla tube 15–18 mm. long; lower lip clearly longer than upper..... *S. coccinea.*

Corolla tube 2.5–4.5 cm. long; lobes subequal or lower shorter.

Upper calyx lobe 3-veined; style villous at tip.. *S. florida.*

Upper calyx lobe 5–7-veined; style glabrous.

Leaves entire, glabrous, to 2.5 cm. long. *S. integrifolia.*

Leaves serrulate, rarely glabrous, 4–15 cm. long.

Trichomes of leaves and branches branched. *S. Haenkei.*

Trichomes of leaves and branches simple.

Leaves lanceolate, to 2 cm. wide, tomentulose beneath..... *S. hapalophylla.*

Leaves ovate or ovate-lanceolate, 2.5–7 cm. wide, not velvety; cf. *S. rubrifaux.*

Flowering calyx 17–19 mm. long, in maturity 20–23 mm. long.

Corolla tube 43 mm. long.... *S. cylindriflora.*

Corolla tube 27 mm. long.... *S. ayavacensis.*

Flowering calyx 9–14 mm. long, in maturity 12–17 mm. long.

Corolla tube pubescent appendaged within. *S. praeclara.*

Corolla tube smooth within.

Stamens at throat; calyces glabrate. *S. psilantha.*

Stamens about medial; calyces villous.

Branches pubescent above.... *S. Heerii.*

Branches long, capitate, glandular pilose. *S. hirta.*

Stamens included in upper lip.
Style glabrous.
Corolla tube 1.5–9 cm. long; upper calyx lobe entire.
Corolla tube binately rugose or papillate within.
Leaves entire; corolla dark blue, tube scarcely exserted. *S. discolor.*
Leaves serrate; corolla red or blue, the tube well-exserted.
Plants glabrous; leaves obtuse.....*S. obumbrata.*
Plants villous; leaves acuminate.
Corolla tube about 2 cm. long.....*S. silvarum.*
Corolla tube at least 4 cm. long.....*S. scandens.*
Corolla tube red, smooth within.
Leaves lanceolate; calyx purplish lanate...*S. lachnostoma.*
Leaves ovate or cordate; calyx not at all lanate (see also *S. Weberbaueri*).
Corolla tube 8–9 cm. long.....*S. Dombeyi.*
Corolla tube 3–5 cm. long.
Calyx in flower 22–26 mm. long, upper lobe acute. *S. acuminata.*
Calyx in flower 17 mm. long, upper lobe mucronate. *S. vestita.*
Calyx in flower 11–12 mm. long, upper lip rounded. *S. tubulosa.*
Corolla blue, the tube 2.5–3 mm. long.
Calyx at maturity scarcely 3 mm. long; obscurely trimucronate.....*S. occidentalis.*
Calyx at maturity 5.5–7 mm. long; shortly spinulose. *S. riparia.*
Style villous at tip.
Flowers in leaf axils.
Corolla 23–35 mm. long, tube papillate within; lower lobe deflexed.
Calyx trichomes few, branched; corolla purple(?). *S. plumosa.*
Calyx trichomes minute, simple; corolla red....*S. formosa.*
Corolla 13 mm. long, red, smooth within; lower lip incurved-concave.....*S. Herrerae.*
Flowers in interrupted spikes.

Corolla red, tube bipapillate within at base (see also *S. cuspidata*).....*S. revoluta.*

Corolla blue or tinted, the tube smooth within (except *S. Weberbaueri, S. Herrerae*).

Stamen connective toothed below; upper lobe obscurely trimucronate.

Corolla tube basally invaginate.

Leaves oblong-lanceolate, 6–12 cm. long..*S. corrugata.*

Leaves deltoid or ovate, about 1–5 cm. long.

Leaves 8–12 mm. long, deltoid.....*S. styphelus.*

Leaves 2–5 cm. long, narrowly ovate, often rounded apically.....*S. bullulata.*

Corolla tube not invaginate.

Corolla tube 8–16 mm. long, trichomes simple.

Corolla tube 15–16 mm. long.....*S. Pavonii.*

Corolla tube 8–11 mm. long.....*S. punctata.*

Corolla tube 5 mm. long, trichomes branched. *S. cuspidata.*

Stamen connective entire below or retrorsely toothed; upper lobe entire.

Upper calyx lobe 3-veined.

Leaves glabrous.....*S. perlucida.*

Leaves softly pubescent beneath.....*S. penduliflora.*

Upper calyx lobe 5–7-veined.

Leaf trichomes branched.

Leaves mostly 1.5–3 cm. wide, the young white, the mature green.....*S. Cruikshanksii.*

Leaves mostly 1–1.5 cm. wide, the mature greenish above, white tomentose beneath.

Calyx 12 mm. long.....*S. grisea.*

Calyx 5–8 mm. long.....*S. griseifolia.*

Leaf trichomes simple.

Leaves entire, 3–8 mm. wide.....*S. sarmentosa.*

Leaves serrate, 1–5 cm. wide.

Corolla blue, tube 5 mm. long; leaves ovate. *S. malacophylla.*

Corolla red; leaves elliptic-lanceolate.

Corolla tube 13 mm. long.....*S. Herrerae.*
Corolla tube 3.5 cm. long.....*S. Weberbaueri.*

VEGETATIVE KEY

Flowers characteristically binate in interrupted racemes; stamens exserted; style glabrous (*S. sarmentosa* might be sought here in fruit, also *S. pseudorosmarinus*, leaves linear).

Calyx subtubular, mostly at least 1 cm. long in flower, the rather narrow lips suberect; corolla red.

Leaves somewhat cordate, usually serrate, often wider than 2.5 cm.....*S. tubiflora.*

Leaves mostly rounded truncate, subentire or crenulate-serrulate, often smaller.

Leaves subcanescent beneath.....*S. striata.*

Leaves green, glabrous to puberulent.....*S. oppositiflora.*

Calyx subcampanulate-turbinate, often shorter than 1 cm. in flower, the broad lips often spreading; corolla not red, sometimes pink in *S. rhodostephana.*

Leaves sagittate-hastate, the basal lobes acute or acuminate.

Leaves subcoriaceous, densely rugose.....*S. sagittata.*

Leaves submembranous, rather smooth....*S. rhodostephana.*

Leaves more or less cordate, the basal lobes rounded or subobtuse; cf. also *S. flocculosa.*

Procumbent or spreading plants.....*S. scutellarioides.*

Erect or suberect plants.

Upper stems as calyces glandular villous; corolla blue.

Spikes elongate; leaves not tomentose...*S. macrophylla.*

Spikes short; leaves white tomentose beneath.
S. camporum.

Upper stems as calyces puberulent villosulous; corolla whitish.....*S. psilostachya.*

Flowers characteristically all or mostly in verticils of (1–) 3–many, the whorls often soon more or less distant (cf. *S. camporum*), rarely always solitary in uppermost (linear) leaves. A few species, especially in fruit, rarely simulate the expedient contrasting character above.

Calyx even in flower at least 1 cm. long.

Calyx about 1–1.5 cm. long; often subturbinate.

Leaves obviously pubescent even in age at least beneath (cf. *S. coccinea*, stems long-hispid toward base).

Calyx green but often pubescent, or if somewhat red or black, pubescent at least below; pedicels short; cf. *S. rubrifaux*.

Leaves broadly ovate to subrotund, often not twice longer than wide, not canescent unless *S. Heerii;* style glabrous; stamens exserted except *S. tubulosa*.

Leaves rounded to truncate at base; calyx subcylindric, 3.5–4 mm. thick. . . . . *S. psilantha*.

Leaves somewhat cordate; calyx subturbinate, 5–7 mm. thick.

Glomerules approximate.

Leaves green or gray-villosulous beneath.

Calyx evenly puberulent, green; corolla white. *S. psilostachya*.

Calyx basally villous, often red or purple; cf. *S. cylindriflora*.

Leaves villous to glabrate; stamens exserted.

Spikes paniculate; leaves subvillous both sides (*S. camporum* might be sought here). . . . . *S. atrocalyx*.

Spikes mostly strict. . . *S. alata, S. speciosa*.

Leaves glabrous above; stamens included. *S. tubulosa*.

Leaves hirtellous beneath, also canescent. *S. Heerii*.

Glomerules about 2 cm. distant. . . . . *S. hirta*.

Leaves ovate-lanceolate or narrower, often about 3 times longer than wide, often canescent; stamens included except *S. Haenkei*.

Calyx about 5 mm. wide below the narrow teeth; trichomes branched; style pilose. . . . . *S. revoluta*.

Calyx 5–7 mm. wide below the broad acute or mucronate teeth; trichomes simple, except *S. Haenkei, S. grisea, S. griseifolia;* style glabrous except *S. pseudorosmarinus*.

Leaves linear; flowers solitary. . *S. pseudorosmarinus*.

Leaves not linear; flowers verticillate.

Leaves smooth, compactly tomentose beneath. *S. discolor.*

Leaves soon bullate, puberulent or tomentose beneath.

Calyx 5–8 mm. long; style subglabrous. *S. griseifolia.*

Calyx 10–15 mm. long; style glabrous (always?) *S. grisea, S. Haenkei.*

Leaves smooth, minutely appressed hispidulous. *S. Weberbaueri.*

Calyx red-purple or dark dotted, glabrate or sparsely glandular all over; stamens exserted except *S. lachnostoma.*

Leaves not canescent; calyx colored.

Calyx glandular, lanate within; pedicels 3–4 mm. long. *S. lachnostoma.*

Calyx glabrate, hispidulous; pedicels 6–10 mm. long. *S. florida.*

Leaves subcanescent beneath; calyx dark dotted. *S. Lobbii.*

Leaves glabrous or nearly, even the younger, or sometimes pubescent but stems long hispid toward base; cf. *S. innoxia.*

Leaves entire; low shrub..... *S. integrifolia.*

Leaves serrate; plants finally tall.

Stems notably hispid toward base..... *S. coccinea.*

Stems glabrous to pubescent toward base, not long-hispid.

Spikes glabrous or nearly.

Upper calyx lip 3-veined; tube to 4 mm. thick. *S. pauciserrata.*

Upper calyx lip 5–7-veined; tube 5 mm. thick. *S. obumbrata.*

Spikes somewhat purplish villous..... *S. silvarum.*

Calyx 1.7–2.5 cm. long or longer; cylindric or subcylindric; stamens exserted only in *S. ayavacensis;* style glabrous.

Flowers axillary in little reduced leaves.

Leaves broadly ovate, glabrate or nearly..... *S. formosa.*

Leaves ovate-lanceolate, pubescent..... *S. plumosa.*

Flowers all or mostly in leafless inflorescences.

Pedicels rather stout, to 2.5 cm. long; flowers to 7 cm. long.

Calyx about 5 mm. wide, to 3 cm. long in fruit; lips acute to long acuminate.....*S. acuminata.*

Calyx soon 6–7 mm. wide; lips shortly acuminate.

Plants villous all over.

Flowers many; stamens exserted.

S. cylindriflora, S. ayavacensis.

Flowers about 3; stamens included.....*S. vestita.*

Plants shortly pubescent; leaves green above.

S. scandens.

Pedicels subfiliform, 2 cm. long or longer; flowers spectacular, red.....*S. Dombeyi.*

Calyx even in fruit often shorter than 1 cm., never much longer (cf. also the basally long-hispid *S. coccinea*).

Leaves rather lanceolate-elliptic, rarely linear, mostly about 3 times (at least) longer than wide; stamens included, style villous (except *S. hapalophylla*, nearly glabrous, *S. Vargasii*).

Leaves entire or obscurely few-serrulate at subobtuse tip.

Leaves entire, 1–2 cm. long.....*S. sarmentosa.*

Leaves often subentire, 3–5 cm. long.....*S. Pavonii.*

Leaves closely crenulate-serrulate.

Leaves green but silky above, canescent tomentose beneath.

S. hapalophylla.

Leaves glabrous or glabrate at least above in age.

Half-shrub, ample leaves tardily bullate....*S. Herrerae.*

Sarmentose shrub, leaves only 1–1.5 cm. long.

S. Vargasii.

Shrubs, the long leaves lanate beneath, often early rugose-bullate above.

Leaves linear; flowers solitary...*S. pseudorosmarinus.*

Leaves oblong-lanceolate; flowers several..*S. corrugata.*

Leaves ovate, mostly about 2 times longer than wide.

Tall, usually 1–2 meters, or clearly shrubs with leaves rarely 6 cm. long; stamens included; style pubescent except *S. malacophylla, S. riparia.*

Calyx scurfy lanate to glandular hispidulous; leaves rarely 6 cm. long.

Perennial herbs, tall.

Trichomes simple.

Leaves obscurely hispidulous above.....*S. riparia.*

Leaves glabrate above.

S. malacophylla, S. incurvata.

Trichomes branched.....*S. trifilis.*

Shrubs, branched, ligneous even above.

Leaves more or less rugose-bullate.

Calyx 5–6 mm. long; corolla 13 mm. long.

S. cuspidata.

Calyx 7 mm. long; corolla 2 cm. long.

Leaves at most 5 cm. long.....*S. bullulata.*

Leaves at least 8 cm. long.....*S. styphelus.*

Leaves smooth.

Calyx hispidulous; leaves glandular punctate beneath.

Leaves longer than 1.5 cm., villosulous; style villous.....*S. punctata.*

Leaves to 1.5 cm. long, hirtellous; style subglabrous.....*S. Vargasii.*

Calyx scurfy lanate, glabrate in age; leaves epunctate; cf. *S. consobrina.*

Leaves 1.5–3 cm. wide, glabrate in age.

S. Cruikshanksii.

Leaves (type) to 12 mm. wide, tomentose beneath; cf. *S. grisea*.....*S. griseifolia.*

Calyx glabrous, glabrate or puberulent but eglandular; leaves green, 6–10 cm. long; flowers white, tinted, rarely purple.

Leaves glabrous or essentially, at least first impression.

Calyx glabrous; flowers tinted.....*S. perlucida.*

Calyx hispidulous; flowers blue-purple...*S. tiliaefolia.*

Leaves villosulous beneath.

Calyx glabrous, purple.....*S. cyanicalyx.*

Calyx puberulent.....*S. penduliflora.*

Low (to a few dm.), stems glabrous or nearly, rarely subligneous; leaves usually 2–few cm. long; stamens, except *S. occidentalis*, exserted; style glabrous.

Calyx 2–3 mm. long; sprawling, often enduring and subligneous below ..... *S. occidentalis.*

Calyx 5–9 mm. long; low annual herbs.

Calyx about 5 mm. across; leaves subrotund. *S. rhombifolia.*

Calyx narrower; leaves ovate to subrotund.

Stems simple; seeds round ..... *S. paposana.*

Stems usually branched near base; seeds ellipsoid. *S. Tafallae.*

Salvia acuminata R. & P. Fl. Peruv. 1: 24, *pl. 37.* 1798; 42.

Lax or subscandent shrub, more or less viscid villous and glandular puberulent, especially the upper branches, petioles—these 3–8 cm. long—and ample panicles; leaves broadly crenate-serrulate, deeply cordate-ovate, acutely acute to caudate-acuminate, 1–3 dm. long, 6–13 cm. wide, sparsely scabriusculous above, villous and puberulent particularly on the prominent reticulate venation beneath; flowers about 6 in, suboblong acuminate caducous bracts 1–3 cm. long; pedicels to 2.5 cm. long; glomerules finally 2–4 cm. distant, calyces to 3 cm. long; flowering calyx tubular, about 2.5 cm. long, sparsely glandular villous, the acuminate lip about 8 mm. long, the lower teeth nearly connate to the apex; corolla scarlet, the tube to 5 cm. long, smooth within, the lips 1–1.5 cm. long.—The viscid indument is sometimes matted on the young branchlets and petioles. Section *Longiflorae,* 115; 310. F.M. Neg. 17630.

Huánuco: Pillao and Chacahuassi, *Ruiz & Pavón,* type. Chaglla, 2,800 meters, *Williams 6699.* Tambo de Vaca, *4320; 4914.* Yanano, *3661.*

Salvia alata Epl. Brittonia 12: 147. 1960.

Shrubby, the rather stout branchlets long-hirsute above and glandular pilose; upper leaves narrowly deltoid, acute, 7–9 cm. long, apparently rounded truncate at base, crenulate-serrulate, sparsely hirsute above, hirtellous especially on the veins beneath, also punctate, sessile-glandular; petioles 3–4 cm. long; flowers more or less crowded in spikes 3–4 dm. long, glomerules 2–5 cm. distant; bracts sessile, ovate, acuminate, 1–1.5 cm. long; calyces 12 mm. long, glandular pilose below, hirtellous above, the pedicels 7–9 mm. long; cylindrical tube of corolla smooth inside, 2 cm. long, upper lip 5–6 mm. long, lower 8–9 mm. wide, both deep blue; stamens attached above

middle, gubernaculum entire, connective exserted 2.5 cm.; style glabrous, to 4.5 cm. exserted, the upper branch reduced; nutlets 5.5 mm. long, strongly alate, the margins deltoid apically.—Closely allied to *S. speciosa* Presl but diminished in all respects; the peculiar triangular tip of the nutlet wing seems to be distinctive and in contrast to the bifurcate wing of *S. speciosa* (Epling). Section *Macrostachyae*.

La Libertad: Rocky slopes, Cachicadán, 2740 meters, (*N. Angulo 1684*, type). Otuzco, 3100 meters, (*López 1521*).

Salvia atrocalyx Epl. Repert. Sp. Nov. Beih. 85: 65. 1935; 26.

Stout perennial, attaining several meters, the upper branches and leaves (both sides) villous, the longer trichomes viscid glandular; petioles 3–6 cm. long; leaves serrate, cordate-ovate, shortly acuminate, 1–1.5 dm. long, 6–10 cm. long; flowers 3–6 verticillate, the rotund concave glabrate bracts 1–1.5 cm. wide, dark purple, the glomerules finally 2–5 cm. distant in laxly paniculate glandular-villous interrupted spikes, the pedicels becoming 1.5 cm. long or longer; calyx dark purple, 10–12 mm. long, basally villous, the lower lip longer than the upper.—Otherwise unknown and from the specimen seen probably a poorly developed branch or plant of *S. speciosa* Presl. Section *Macrostachyae*, 64; 85.

Junín: Carpapata above Huacapistana, *Killip & Smith 24401*, type.

Salvia ayavacensis HBK. Nov. Gen. & Sp. 2: 298. 1818; 32. *S. mucidistachys* Epl. Repert. Sp. Nov. Beih. 85: 120. 1936.

Perennial herb, several dm. high, shortly and densely villous all over with simple gland-tipped trichomes; lower petioles to 4.5 cm. long, nearly lacking toward inflorescences; leaves cordate-deltoid, obtuse or rounded, 4–6 cm. long and wide, crenate; flowers 3–6, the glomerules to 3 cm. distant; pedicels to 1.5 cm. long; calyx in flower about 17 mm. long, in fruit 2 cm. long, the acuminate 7-veined upper lip longer than the lower; corolla tube 27 mm. long, smooth within, the upper lip 1 cm. long, the lower about 1.5 cm. long; stamens at throat, filaments 4 mm. long, connective nearly 4 cm. long.—As suggested by Epling his plant proved to be the same as the type at Paris, not seen by him. Section *Cylindriflorae*, 118; 117. F.M. Neg. 39441.

Piura: Río Cutaco near Ayavaca, *Bonpland*, type. Near Ayavaca, *Weberbauer 6399* (type, *S. mucidistachys*).

Salvia bullulata Benth. in DC. Prodr. 12: 327. 1848; 22. *S. pustulata* Benth. l.c.

Branches, petioles (6–10 mm. long) and leaves beneath densely hispid-villous; leaves mostly narrowly ovate, truncate-subcordate or narrowed-rounded at base, rounded or obtuse at apex, 2–4.5 cm. long, 1–2 cm. wide, strongly rugose-bullate above, the tubercles hispidulous, the veins conspicuously reticulate beneath; flowers about 3 in verticils, the ovate caducous bracts 2 mm. long, the glandular hispid glomerules in interrupted spikes; pedicels 2 mm. long; calyx 7 mm. long, the upper 3-mucronate lobe 7-veined, the little shorter lower segments acute; corolla tube 13 mm. long, constricted below, ampliate above, the upper lip 7, the lower 7–8 mm. long.—Leaves of *S. pustulata* truncate or subcordate at base instead of cuneate (Bentham). Section *Corrugatae*, 59.

Amazonas: Chachapoyas, *Mathews 2132*, type; *1529* (type, *S. pustulata*).

Salvia camporum Epl. Bull. Torrey Club 71: 489. 1944.

A perennial herb to a meter tall, the rather stout stems, as calyces, glandular villous; petioles to 3.7 cm. long; leaves cordate, acuminate, to at least a dm. long, serrulate-crenate, densely villosulous above, white tomentose beneath; bracts bidentate, deciduous (always?); flowers apparently opposite, approximate in short spikes, the upper calyx lip at least sometimes 3-dentate, 7-veined, longer than the lower, this with deltoid teeth, the tube 3.5 mm. long; tube of the blue corolla 11 mm. long, smooth within, apparently laterally bisaccate, the upper lip acute, the lower (not seen completely) probably longer and spreading; stamens exserted 1.5 cm., affixed from above the middle, basally ampliate; style glabrous, upper branch short. Section *Macrostachyae*, 64; 85.

Amazonas: In any open grassland, Chachapoyas, *Metcalf 30805*, type.

Salvia coccinea Juss. ex Murray, Comm. Goett. 1: 8, *pl. 1*. 1778; 24. *S. pseudococcinea* Jacq. Coll. 2: 302. 1786.

Annual, the stems conspicuously subhispid toward base with long divaricate white trichomes, the indument otherwise mostly a crisped puberulence or the leaves nearly glabrous above; petioles slender, 1–3.5 cm. long; leaves crenate, ovate, rounded or subtruncate to subcordate and acute at petiole, obtuse or acute, mostly 3–6 cm. long, more than half as wide; flowers (1) 3–6, the only sometimes sub-

persisting bracts ovate-acuminate, the glomerules soon about 1.5–several cm. distant; calyx about 7 (–10) mm. long, often slightly glandular and purplish, the upper lip 5–7-veined, the teeth acutely mucronate; corolla usually scarlet, the tube 13–17 mm. long, the upper lip 3.5–5 mm. long; stamens exserted 3–4 mm., the style hirtellous; nutlets 2.5 mm. long, subacute.—Section *Subrotundae*, 124; 132, or *Rhombifoliae*, 60; 80. Illustrated, Pohl, Pl. Bras. Icones 2: *pl. 192* (as *S. glaucescens*).

Lima: Río Santa Eulalia, Chosica, *488.*—Loreto: Yurimaguas, *Williams 4083.*—Cuzco: Machu-picchu, *Vargas 818.* Warmer America.

Salvia consobrina Epl. Brittonia 12: 149. 1960.

A little shrub, the slender branches glabrate below, canescent with branched trichomes toward the rather densely spicate flowers; leaves ovate, the upper 5–6 cm. long, shortly acuminate, attenuate to 1 cm. long petioles, crenate-serrate, sparsely hirsute above, venose and subflocculose beneath, the trichomes branched; pedicels 5–6 mm. long; bracts of verticils deciduous; calyx 8 mm. long, upper lip subrotund, 7–9-veined, little longer than the lower, white floccose; tube of the violet corolla 11 mm. long, smooth inside, the lips subequal; stamens affixed at throat; gubernaculum subentire or obscurely dentate, included in upper lip; style hirsute, posterior branch longer; nutlets ovate, 2 mm. long.—A close associate of *S. leucocephala* but inflorescence more lax, smaller bracts deciduous, smaller leaves attenuate at base and entire plant less pubescent (author).

La Libertad: Prov. Otuzco, 2720 meters, (*López et al. 2281*, type, UCLA).

Salvia corrugata Vahl, Enum. 1: 252. 1805; 327; 21.

Branchlets, leaves beneath and dense spikes early villous-lanate, the calyces somewhat viscid; internodes of the principal branches 5–10 cm. long, laterals to 1 cm. long; petioles to 1.5 cm. long; leaves crenate-serrate, oblong-lanceolate, rounded to truncate at base, acute or obtuse, 6–12 cm. long, 1.5–3 cm. wide, subglabrous and very bullate-rugose above; flowers 6–12, bracts ovate, 5–10 mm. long, the lower subfoliose, the cylindric spikes 3–8 cm. long; pedicels 2–3 mm. long; calyx 6 (9) mm. long, in fruit 9–10 mm. long, 7-veined upper lip obtuse, lower acuminate segments shorter; corolla dark blue, the tube 11–13 (18) mm. long, strongly constricted at ventricose base, the upper lip 7–8 (10), the lower 6–9 mm. long.—Calyx (in flower) 9 mm. long, corolla tube 18 mm. long, upper lip 1 cm. long (Epling).

Stork & Horton 10203, Herb. Berkeley, is apparently undescribed (Epling); indument golden-yellowish, flowers evidently red-blue beneath the pubescence. Section *Corrugatae*, 59; 50.

Piura: Huancabamba, *Weberbauer 6043*.—Amazonas: Chachapoyas, *Mathews 1346*.—Huancavelica: South of Salcabamba, 3,300 meters, *Stork & Horton 10297*. To Colombia.

Salvia Cruikshanksii Benth. Lab. Gen. & Sp. 261. 1833; 36. *S. leucoclada* Benth. in DC. Prodr. 12: 314. 1848.

Shrub, often distinctive by more or less rapidly deciduous white tomentum that covers the younger shoots and leaves, these glabrate to even glabrous in age; petioles shorter than 1 cm.; leaves crenate-serrate, ovate, rounded at base, subacute, 2–4.5 cm. long, 1.5–3 cm. wide; flowers 3–6, the promptly caducous ovate acuminate bracts 5–8 mm. long, the glomerules 1–3 cm. distant on arcuate spikes rarely a dm. long; pedicels 3.5 mm. long; calyx shortly cinereous villosulous, often purplish, 6–6.5 mm. long, little enlarging, the upper sub-trimucronate lip 1.5 mm., equaled by the acute lower teeth; corolla tube blue, 5–5.5 mm. long, smooth within, nearly straight, the upper lip 4.5, the lower 8–10 mm. long.—Trichomes, at least in part, branched, the basal shoots early white tomentose, this indument more or less persisting, the flowering branch and leaves glabrous. The name here spelled as by Bentham but it was written elsewhere (as in Index Kewensis and by Weberbauer) *Cruckshanksii* while the collector himself at least as author (The Practical Planter) wrote *Cruickshank*. Section *Flocculosae*, 77; 153. F.M. Negs. 29050; 29067.

Lima: Rocky slopes near Matucana, *83; Goodspeed 11339* (det. Johnston). Saratier, near Obrajillo, (*Cruikshanks*, type). Canta, *Pennell 14332; Soukup 2381*. San Buenaventura, *Pennell 14506; 14510*. Huamantango, *Mathews 462*. Puruchuco, *Mathews 464* (type, *S. leucoclada*). Viso, *Goodspeed Exped. 11523*.—La Libertad: Santiago de Chuco, 315 meters, (*López 0943*).

Salvia cuspidata R. & P. Fl. Peruv. 1: 23, *pl. 40*. 1798; 19.

Shrub about a meter tall, the sparsely floccose branched indument subglandular above; petioles 3–5 mm. long; leaves ovate, truncate to subcordate at base, obtuse, unevenly crenulate, 2.5–3.5 cm. long, 1.5–2 cm. wide, only slightly bullate and pubescent above but cinereous tomentulose beneath; flowers 3, the caducous ovate bracts 3–4 mm. long, the glomerules 0.5–1.5 cm. distant in lax often panic-

ulate spikes; calyx 5–5.5 mm. long, little enlarged in fruit, glandular hispid, the subequal lips about 1.3 mm. long, the 3-cuspidate upper subspinulose, the divisions of the lower acuminate spinulose; corolla tube 5 mm. long, smooth within, lightly ventricose, the upper lip 4–5, the lower about 8 mm. long.—Relatives all south of Peru except *S. Humboldtiana* Dietr. (*S. pulchella* HBK. not DC.) with entire leaves. Section *Tomentellae*, 55; 19. F.M. Neg. 17643.

Lima: Cheuchin, *Dombey; Ruiz & Pavón*, type. San Domian, *Hrdlicka*. Puruchuco, *Mathews 463*.—Ancash: Llata, *2297*. Chiquian, (*Ferreyra 7303; 5686*).

Salvia cyanicalyx Epl. Bull. Torrey Club 68: 564. 1941.

Perennial herb, to a meter high, the branches minutely appressed hirtellous, the internodes longer than the broadly ovate serrate leaves, these acutely short-acuminate, abruptly and narrowly cuneate to petiole (3–4 cm. long), obscurely hirtellous above, white tomentulose beneath, 8–11 cm. long, 7–8 cm. wide; flower verticils 1–1.5 cm. distant, the bracts caducous; calyx a deep cyanic blue, subglabrous, 9 mm. long or finally 12 mm. long, 10 mm. broad, the spreading lobes (upper 3-veined) acuminate; corolla light blue, the somewhat ventricose tube 12 mm. long, the upper lip 4–5 mm. wide.—Allied to *S. amplifrons* Briq. of Bolivia with smaller corollas, proportionately narrower leaves (author). Here or to *S. pendulifora* would key *Metcalf 30599*, 2 to 6 km. from Oconeque, Puno (Herb. Berkeley), no corollas, sp. nov. (Epling). Section *Angulatae*, 67; 234.

Apurímac: Ampuy, *Goodspeed Exped. 10618*, type. Prov. Abancay, *Vargas 464*.

Salvia cylindriflora Epl. Repert. Sp. Nov. Beih. 85: 122. 1936; 33.

Apparently a shrub, the internodes 5–8 cm. long, the branches, leaves beneath, especially on the veins and panicles, villous or villosulous, the firmer trichomes of pedicels (8–16 mm. long) or calyces glandular; petioles 3–4 cm. long; leaves serrate, ovate-lanceolate, rounded-subcordate at base, acuminate, 1–1.5 dm. long, 3.5–4.5 cm. wide, hispidulous above; flowers 3, bracts caducous, glomerules 1–4 cm. distant; calyx in flower 8–19 mm. long, in fruit 22–23 mm. long, the upper lip and lower teeth acute, 4–5 mm. long; corolla cylindric, the tube 43 mm. long, gradually ampliate, smooth within, the lips 6 mm. long; stamens at throat, filaments 5 mm. long, connective

23 mm. long; style glabrous.—Type of the section *Cylindriflorae*, 118; 117.

Piura: Huancabamba, (*Pearce 565*, type).

Salvia discolor HBK. Nov. Gen. & Sp. 2: 294. 1818; 338; 22.

Shrub or early with only ligneous caudex, the few ascending stems several dm. tall, compactly white tomentose below as the entire coriaceous leaves beneath, glabrous toward the apparently viscid apex, the latter glabrous above; petioles 7–13 mm. long; leaves oblong-ovate, rounded at base, obtuse, 3–6 cm. long, 12–25 mm. wide; flowers 3–9, the caducous ovate-lanceolate acuminate bracts 6–10 mm. long, the glomerules finally 2–6 cm. distant; pedicels 3–4 mm. long; calyx subcanescent with shortly branched trichomes, chartaceous, early 12–16, at maturity about 25 mm. long, the very obtuse to mucronate lip 5–7 mm. long; corolla dark blue, the thick ventricose tube constricted under the lower lip, 13 or 14 mm. long, binately rugose within, the upper lip 7–9 mm. high, the lower 9–11 mm. long; style glabrous; gubernaculum entire or obscurely incurved.—Section *Discolores*, 87. Illustrated, Epling, l.c. 110, *pl. 7*.

Piura: Huancabamba, *Bonpland*, type; *Weberbauer 6069*.

Salvia Dombeyi Epl. Repert. Sp. Nov. Beih. 105: 43. 1938. *S. longiflora* R. & P. Fl. Peruv. 1: 23, *pl. 40*. 1798; 346, not Willd. Sp. Pl. 1: 141. 1798.

Lax flowering branches villous-hirsute, racemes, except corollas, glabrous or glabrate; petioles 2–6 cm. long; leaves cordate-ovate, long-acuminate, crenate-serrate, 8–13 cm. long, mostly half as wide, green and sparsely pubescent above, canescently villous beneath unless in age; flowers 3–6, the caducous membranous ovate bracts glabrous, 1.5–2 cm. long; glomerules finally 1–2 cm. distant, the spikes 1–2 dm. long; calyx glabrous, purplish, about 4 cm. long, 1 cm. in diameter, the lips acute, 1.5 cm. long, the lower segments subunited; pedicels very slender, more or less arcuate, 1–3 cm. long; corolla tube cylindric, (6) 8–9 cm. long, the lip about 2.5–3 cm., the tube slightly constricted below the upper, smooth within.—Marked by the broad glabrous calyx, the showy flowers. Type, *Dombey 280* of Ruiz and Pavón Expedition. Collected also in Cajamarca, Huánuco and Lima by Raimondi. A tree 3–5 meters tall (Vargas); a vine with scarlet flowers (Metcalf); a splendid plant. Section *Longiflorae*, 115; 310. F.M. Neg. 8350; 17651.

Junín: Near Tarma, (*Dombey 280*); *Ruiz & Pavón*, type.—Cuzco: Near Marcachea, Prov. Paucartambo, 2,400 meters, *Vargas 11106*. Near Cuzco, *Pentland; Mrs. Alfred Hamill.* Ollantaitambo, (*Cook & Gilbert 775; 1209*).—Puno: Near Limbani, *Metcalf 30476*.—Huánuco: Chavanillo, (*Woytkowski 886*). Without locality, *Lechler 1969*. "Llagas-ñujchchu" (Herrera), "chenchelcoma" (Ruiz & Pavón), "sacha ñucchu" (Vargas). Bolivia.

Salvia flocculosa Epl. & Math. Brittonia 8: 306. 1957.

A small maritime half shrub with ovate obtuse leaves rounded at base, 1–1.5 cm. long, the entire plant equally (more or less) flocculose-hirtellous; petioles slender, 3–5 mm. long; flowers opposite, in axils of the upper leaves; corolla tube 6 mm. long; calyx 5 mm. high; nutlets apparently smooth.—Section *Hastatae*.

Lambayeque: Near Chiclazo, (*Sandeman 4151*, type, UCLA).

Salvia florida Benth. in DC. Prodr. 12: 338. 1848; 45.

Scandent shrub, the branchlets, petioles—these 1.5–3.5 cm. long—and serrate leaves beneath villous or closely villosulous; leaves ovate-elliptic, narrowed or rounded at base, sparsely hirtellous above, 8–15 cm. long, 2.5–7 cm. wide; flowers 6–12, the deciduous ovate acuminate puberulent bracts 8–10 mm. long; glomerules finally about 13 mm. distant, the spikes 1.5–2.5 dm. long; pedicels 6–10 mm. long; calyx purplish, sparsely reddish pubescent, within hispidulous, about 1.5 cm. long, the tips 5–6 mm. long, acuminate-caudate, the lower segments united; corolla tube 2.5–3 cm. long, smooth within, the lip 5 mm. long; stamens at throat, minutely glandular, the filaments 5 mm. long, connective nearly 4 cm. long, dilated part 2.5 cm. long.—Calyx in Cajamarca specimen 12–13 mm. long in flower, the corolla tube about 26 mm. long, stamens correspondingly smaller but certainly this species (Epling). Section *Floridae*, 118; 335.

Cajamarca: Socota to Tambillo, Prov. Cutervo, *Stork & Horton 10180*.—Amazonas: Chachapoyas, *Mathews 173*; (*Ochoa 1644*).—San Martín: Taulia near Moyobamba, *Mathews 1347*, type.

Salvia formosa L'Hér. Stirp. 1: 41, *pl. 21*. 1786; 327; 42. *S. leonuroides* Glox. Obs. Bot. 15, *pl. 2*. 1785. *S. nodosa* R. & P. Fl. Peruv. 1: 25, *pl. 41*. 1798.

Green virgately branched shrub sometimes a meter tall or taller, the foliage early a little glandular puberulent or resinous; petioles 1–3 cm. long; leaves obscurely serrulate, veiny, subcoriaceous, broadly

ovate or subrotund, subobtuse or rounded both ends, 2.5–8 cm. long and broad; flowers 3–6 in the axils of the upper leaves, scarlet; pedicels to 1 cm. long; calyx about 2 cm. long, early puberulent, 2.5 cm. long in fruit, the lips 1 cm. long, lower teeth connate below the middle; corolla tube 23 mm. long, ventricose below the lower lip, retrorsely binately papillate within 3 mm. above the base, the lips 1.5 cm. long. —Section *Leonuroideae*, 97; 304. F.M. Neg. 17650 (type, *S. nodosa*).

Lima: *Soukup 2923*.—Huánuco: Near Huánuco, *Stork & Horton 9387; Pearce; Ruiz & Pavón* (type, *S. nodosa*); *Kanehira 63; Sawada 49; 106*. Ambo, *3153*. Tingo María, *Soukup 2273*.—Junín: Tarma and Jauja, *Mathews 799*. Ecuador. "Sacconche" (Ruiz & Pavón).

Salvia grisea Epl. & Math. Brittonia 8: 308. 1957.

Procumbent-ascending from a ligneous caudex, attaining 1–3 dm., gray floccose-tomentose with branched trichomes except the leaves above greenish and the calyces; petioles slender, 2–5 mm. long; leaves oblong, obtuse, broadly truncate-cordate, crenate, 2–5 cm. long, 3–12 mm. wide, the smaller revolute; glomerules 1–2.5 cm. distant in rather congested spikes, the bracts caducous; calyx in flower 12–13 mm. long, the acuminate teeth 4 mm. long; corolla tube about 12 mm. long.—Known at 2700 to about 3500 meters. Section *Flocculosae*.

La Libertad: Prov. Otuzco, (*N. Angulo 0942*). Usquil, (*Ferreyra 7628*, type, U. S. Nat. Herb.). Salpo, (*López 1847*); also, Santiago de Chuco.

Salvia griseifolia Epl. Repert. Sp. Nov. Beih. 85: 78. 1935; 37. *S. sideritidis* Presl ex Benth. Lab. Gen. & Sp. 255. 1833, not Vahl, 1805.

Shrub, the branches and leaves beneath white tomentose; petioles 2–3 mm. long; leaves crenate, narrowly ovate, 2–3 cm. long, 10–12 mm. wide, greenish above; flowers 3–6, the reniform-ovate acuminate bracts reflexing, 4–6 mm. long; glomerules 1–2 cm. distant; pedicels 2–3 mm. long; calyx 5–6 mm. long, floccose tomentulose, in fruit 8 mm. long, upper lip submucronate, lower medially connate teeth acuminate; corolla tube nearly 6 mm. long, ventricose upper lip 5 mm. high, lower 8 mm. long; connective dilated into a retrorse tooth; style nearly glabrous; nutlets 1.8 mm. long.—Simulates *S. Haenkei* Benth. with larger leaves and flowers. Section *Flocculosae*, 77; 153.

Huánuco: (*Haenke*, type, Kew, as seen by Epling). Without locality, (*Lobb 237*).

Salvia Haenkei Benth. Lab. Gen. & Sp. 283. 1833; 34.

Leafy slender branched shrub, 1–2.5 meters tall, the leaves beneath yellowish puberulent to white tomentose with branched trichomes, the long corollas purple or scarlet; petioles to 2 cm. long; leaves closely crenulate, oblong-elliptic-lanceolate, rounded to acute at base, acutely or obtusely acuminate, 4–14 cm. long, 1–4 cm. wide, coriaceous, subglabrous and bullate rugulose above; flowers mostly 3, bracts deciduous, ovate or linear-lanceolate, 5–20 mm. long, the glomerules finally mostly 1–2 cm. distant in spikes often 1.5–2 dm. long; pedicels 4–5 mm. long; calyx 10–12 mm. long, in fruit 14–15 mm. long, tomentose or glandular puberulent with branched trichomes, the upper lip rounded, the lower teeth acute; corolla tube 2.5–3 cm. long, slender, smooth within, the lip about 5–7 mm. long; filaments at throat, 3–4 mm. long, connective 18–27 mm. long, jointed a little above the middle, the gubernaculum 9–13 mm. long. —Type by Haenke, without locality, in Munich (as seen by Epling), the leaves white tomentose beneath; *Soukup 400* labeled as from Puno was collected at La Paz, Bolivia (Killip). *S. Rusbyi* Britton of La Paz has glabrous leaves, caudate calyx teeth. Section *Cylindriflorae*, 118; 117. Illustrated, Epling, l.c. 110, *pl. 17*. F.M. Neg. 20394.

Arequipa: Chachani, *Hinckley 30*.—Moquegua: Carumas, *Weberbauer 7270*. Bolivia.

Salvia hapalophylla Epl. Repert. Sp. Nov. Beih. 85: 122. 1936; 34.

Simple in type, 8 dm. tall, lignescent, densely foliose above, the upper enlarged leaf nodes 1–2 cm. distant, canescently puberulent-tomentulose or glabrate in age except the leaves above and the yellowish-sericeous calyces; petioles 1–3 (–4) mm. long, becoming obsolete upwards; leaves serrulate, lanceolate, narrowed to rounded base, acutely acuminate, the medial 8–10 cm. long, 1.5–2 cm. wide, all softly puberulent above but drying greenish; bracts caducous, ovate-acuminate, 3–5 mm. long; spikes 1–1.5 dm. long, the glomerules 1–1.5 cm. distant; pedicels 2–3 mm. long; calyx tube 6–7 mm. long, the lip 2.5–3 mm. long; corolla tube red, yellowish villous, 26–28 mm. long, the upper lip to 1.5 mm. emarginate, 6–6.5 mm. long; filaments 3.5 mm. long, connective 23 mm. long, dilation half as long.—Type from shrubby to woody grass steppe. Section *Cylindriflorae*, 118; 117.

Cuzco: Chilechile, 2,200 meters, Valle Marcapata, *Weberbauer 7858*, type.

Salvia Heerii Regel, Gartenfl. 4: 77, *pl. 115*. 1855; 32.

Resembles *S. hirta* HBK. but more pubescent; petioles 2–8 cm. long; leaves sometimes cordate, 5–13 cm. long, 3–7 cm. wide, hirtellous both sides but denser and often canescent beneath; calyx in flower 9–12 mm. long, viscid villous, the acuminate lip 2.5–4 mm. long; corolla lip 6 mm. long; filaments a little above middle, 4 mm. long, connective 3.5–4.5 cm. long.—Ex char. seems doubtfully distinct but the glomerules finally 5–10 mm. distant in villosulous, often glandular panicles. Type grown in Zurich from specimen by Warscewicz, who collected from the Marañón Valley to Bolivia. Section *Cylindriflorae*, 118; 117.

Cajamarca: Chota to Cutervo, (*Jelski 119*). Bolivia?

Salvia Herrerae Epl. Repert. Sp. Nov. Beih. 85: 93. 1935; 45.

Green, foliose, the lax or arcuate flowering stems or branches sparsely yellowish pilose, the leaves nearly glabrous; petioles 3–5 mm. long; leaves narrowly ovate- or oblong-lanceolate, serrate, rounded or usually shortly narrowed at base, gradually and acutely acuminate, 5–13 cm. long, 2–3 cm. wide, soon subcoriaceous, rugulose above; flowers 3–6, the glomerules 0.5–1.5 cm. distant, the caducous narrowly lanceolate acuminate bracts about 7 mm. long; calyx 8–10 mm. long, not longer in fruit, green, only early slightly hirsute, the lips 4 mm. long, the upper 3-veined, acuminate as the 3 lower teeth, these basally connate; corolla tube 13 mm. long, subventricose, villosulous, smooth within, the upper lip scarcely 4 mm. high; filaments 2 mm. long, connective 6.5 mm. long, dilation 4.5 mm. long; style villous; nutlets rounded both ends, at least 2 mm. long.—Author placed it in Section *Secundae*, 92; 342, the other species Brazilian, and described it as a shrub but the flowering stems are herbaceous or pithy.

Cuzco: Machu-picchu, *Herrera 3207*, type. Valle Urubamba, *Herrera 1556*.

Salvia hirta HBK. Nov. Gen. & Sp. 2: 296. 1818; 119.

Apparently rather similar to *S. ayavacensis* HBK. but slender, less pubescent, smaller flowered; petioles 1–3 cm. long, the upper also developed; leaves ovate, rounded at base, acute or acuminate, 4–8 cm. long, 2–4.5 cm. wide, hirtellous or subglabrous above, villosu-

lous beneath; flowers 1–3, caducous ovate-caudate bracts 5–8 mm. long, glandular, the glomerules in age 1–2 cm. distant in viscid pubescent panicles; calyx about 1 cm. long, little longer in fruit, hispidulous and with longer glandular trichomes, the upper lip 2.5–3 mm. long, acuminate as the lower, the teeth connate below the middle; corolla tube 2.5 cm. long, smooth within, lips 4 mm. long; filaments 3.5 mm. long, connective about 3 cm. long.—Section *Cylindriflorae*, 118; 117. F.M. Neg. 39444.

Piura: Ayavaca and Lucarque, *Bonpland*, type. Ecuador.

Salvia incurvata R. & P. Fl. Peruv. 1: 24, *pl. 42*. 1798; 350.

Tall erect herb, branched above, the upper quadrate stems and branches puberulent; petioles slender, to about 2 cm. long; leaves rounded or subcordate-ovate, abruptly acute, serrulate, to 6 cm. long, 4 cm. wide, venose and lightly rugulose, glabrous or nearly above, at least early canescent tomentulose beneath; spikes to 1.5 dm. long, the several flowered glomerules to 3 cm. distant; pedicels may be about 5 mm. long in fruit, calyx glabrous or nearly, 7 mm. (in fruit), subcampanulate, the upper entire calyx lip 3-veined, the teeth acuminate; bracts ovate, caducous; corolla about as long as calyx (Ruiz & Pavón), purple-blue, the upper lip bifid, the lower trifid, the medial lobe emarginate.—Description compiled from negative and Ruiz and Pavón; may be near *S. malacophylla* Benth. or some earlier name. Not seen by Epling. F.M. Neg. 17648.

Huánuco: Muña, *Ruiz & Pavón*, type.

Salvia innoxia Epl. & Math. Brittonia 8: 309. 1957.

An innocuous perennial herb probably from a ligneous caudex, attaining about 3 dm.; petioles 1–1.5 dm.(?) long, the oblong-ovate leaf blades mostly 3–5 cm. long, serrulate, glabrous, paler and more or less veiny below; flowers 6 or more in verticils 1–3 cm. distant in spikes 8–10 cm. long the bracts often tardily deciduous; flowering calyx 10–12 mm. long, capitately glandular, the slender pedicels 4 mm. long; corolla tube 10–11 mm. long; style hirtellous.—To be found in key somewhere near *S. loxensis* Benth. or *S. platystoma* Epl. (Bolivian).

Ancash: Bolognesi, (*Ferreyra 7555*, type, U. S. Nat. Herb.).

Salvia integrifolia R. & P. Fl. Peruv. 1: 26, *pl. 35*. 1798; 35.

Nearly glabrous intricately branched shrub, the bark exfoliating; petioles 3–5 mm. long; leaves subentire, narrowly ovate, elliptic or

linear-oblong, more or less narrowed to rounded base, obtuse, 1–2.5 cm. long, 2.5–10 mm. wide, glabrous; flowers 1–3, the deciduous bracts ovate, acuminate, 2–3 mm. long, 5–6 mm. distant in spikes 3–5 cm. long; pedicels 4–6 mm. long; flowering calyx nearly glabrous but often yellowish hirtellous at base, hispidulous within, 12–14 mm. long, in fruit 17–18 mm. long, the lips acute; corolla yellowish red, the tube 3–4 cm. long, cylindric, yellowish hirsute, the upper lip 5–6 mm. long, the lower shorter; stamens at throat, filaments 2.5 mm. long, connective 4 cm. long, dilation pubescent.—In type the tube is 2 cm. long. Section *Cylindriflorae*, 118; 117.

Lima: Cheuchin near Cajatambo, (*Ruiz & Pavón*); *Dombey 273*, type. Cayatambo, near Churin, (*Ferreyra 6172; 5357; 3521*, det. Epl. & Math.).

Salvia lachnostoma Epl. Repert. Sp. Nov. Beih. 85: 117. 1936; 44.

Pleasantly mint-scented sprawling shrub with short in part somewhat purplish villous indument and rather few purple or purple-red flowers; leaves finely serrate, oblong-lanceolate, acute at base, acuminate to apex, 5–10 cm. long, 1.5–2.5 cm. wide or somewhat larger, glabrate and rugulose above in age, sparsely pubescent beneath; flowers 3–6, the bracts caducous, ovate-lanceolate, 4–6 mm. long; glomerules finally 1–3 cm. distant, the racemes few; pedicels about 3 mm. long; calyces on veins sparsely purplish glandular, in throat purple lanate, 8–10 mm. long, the lips acute; corolla tube 28–32 mm. long, smooth within, gradually ampliate, the upper lip about 1 cm. long, the lower little shorter; filaments 4–5 mm. long, connective 18–22 mm. long; style glabrous.—Section *Longiflorae*, 115; 310.

Huánuco: Muña to Tambo de Vaca, *4309; Pearce*. Playapampa, *4478*, type.

Salvia Lobbii Epl. Repert. Sp. Nov. Beih. 85: 126. 1936.

Ligneous, at least in part, the internodes 2–3, the branchlets, petioles (8–12 mm. long) and leaves both sides at least sparsely villous or villosulous; leaves coarsely serrate, ovate, rounded-subcordate at base, 3–4.5 cm. long, 1.5–2.5 cm. wide; flowers about 3, the caducous ovate bracts 3–4 mm. long, the glomerules crowded in short spikes, these beside the terminal, in the upper leaf-axils; calyx sparsely glandular-hirtellous, 1 cm. long, the lips 2.5 mm. long, the acute upper lip 7-veined, the lower segments acuminate; corolla blue, the tube 22 mm. long, gradually ampliate, smooth within, the lips 5 or

6 mm. long; filaments 5.5 mm. long, connective 3.5 cm., extended below middle of tube, entire; style glabrous.—The related *S. pichinchensis* Benth. has upper calyx lip 3–5-veined, broadly ovate almost subrotund leaves. Section *Siphonanthae*, 125; 83. F.M. Neg. 32938.

Peru (or Ecuador, type, Herb. Kew, *Lobb 293*).

Salvia macrophylla Benth. Lab. Gen. & Sp. Suppl. 725. 1835; 26.

Glandular villous as in the related *S. sagittata* and *S. scutellarioides*, and with similar inflorescence but suffrutescent and the membranous leaves deltoid or cordate, rounded, truncate or somewhat hastate at base, acuminate, the larger 1–2 dm. long, 8–15 cm. wide, hirsute above, pilose-villous beneath; petioles to 1.5 dm. long; pedicels as the obovate bracts 6–7 mm. long, to 2 cm. distant, calyx 6 or in fruit 10–12 mm. long; stamen connective about 2.5 cm. long, the dilation 5 or 6 mm. long.—Var. *malacophylla* Benth. in DC. Prodr. 12: 347, has leaves softly tomentose villous beneath (*Mathews*, type); may be a part of *S. scutellarioides* HBK. at least as to the southern specimens. Section *Hastatae*, 62; 88.

La Libertad: Santiago Chuco, (*López 1098*).—Amazonas: Near Chachapoyas, (*Ferreyra 7105*).—Lima: Near school, *Mexia 04061*.—Huánuco: Near Huánuco, *Stork & Horton 9374; Mathews 709* or *800*, type. Muña, *4063; 4064*.—Huancavelica: Salcabamba, *Stork & Horton 10294*.—Apurímac: Abancay, *Goodspeed Exped. 10555*. Puicus, *West 3756*. To Colombia.

Salvia malacophylla Benth. in DC. Prodr. 12: 312. 1848; 38.

Herb with arcuate-ascending lax (or erect?) stems glandular villosulous above; petioles 5–10 mm. long; leaves serrulate-ovate, rounded at base, acute, soon glabrate above, somewhat canescent beneath; flowers 3–6, the ovate caducous bracts 2–3 mm. long, glomerules 1–3 cm. distant in spikes 1.5–2 dm. long; pedicels 3–4 mm. long; calyx 4.5 mm. long, glandular hispidulous, in fruit 6.5 mm. long, the upper lip submucronate, the lower teeth acuminate; corolla tube 5 mm. long, nearly straight, smooth within, the upper lip 3 mm. high, the lower 5 mm. wide; connective dilated at joint into a retrorse tooth; style pilose.—After Epling, who questioned the identity of *S. mitis* R. & P. in referring it here; see *S. punctata* R. & P. *S. malacophylla* is nearly *S. mitis* but stems diffuse with ascending flowering branches, leaves not rugose, these 2.5–3.5 cm. long, calyces finally 6 mm. long,

corolla about 12 mm. long (author); may be a part of *S. riparia* HBK. Character, Section *Malacophyllae*, 47. F.M. Neg. 29071.

Amazonas: Chachapoyas, *Mathews 3156* (type, *S. malacophylla*).

Salvia obumbrata Epl. Repert. Sp. Nov. Beih. 105: 39. 1938; 39. *S. umbratica* Epl. l.c. 85: 91. 1935, not Hance, 1870.

Herb, or ligneous at base, glabrous or nearly except for an obscure pulverulence on the flowering stems and calyces; petioles 3–5 cm. long; leaves minutely serrulate, ovate or ovate-elliptic, little narrowed to the rounded base, subobtusely acuminate, 8–10 cm. long, 4–6 cm. wide; flowers about 6, bracts unknown, glomerules finally 1–3 cm. distant; pedicels 3–4 mm. long; calyx 12 mm. long, nearly mature, 17 mm. long, the upper lip 5–7-veined, mucronate, the lower teeth acuminate; corolla tube rather ventricose, about 18 mm. long, bipapillate within at base, the upper lip 8 mm. high, the lower to 1.5 cm. wide; filaments 3 mm. long, connective 12 mm. long, dilation entire; style glabrous. Section *Umbratiles*, 91; 272.

San Martín: Tarapoto, *Spruce 4330?* (no corolla).—Junín: Puente Perené, *Killip & Smith 25311*, type.

Salvia occidentalis Sw. Prodr. Veg. Ind. Occ. 14. 1788; 18. *S. procumbens* R. & P. Fl. Peruv. 1: 27. 1798, fide DeCandolle.

Diffuse procumbent even subscandent annual or perennial and ligneous below, sometimes several dm. long, crisply hirtellous to glabrous, leaf indument (when present) appressed on upper surface, more or less glandular among the flowers; petioles to 1 cm. long; leaves broadly ovate or subrhombic, cuneate to base, subacute, crenate-serrate above the middle, 2–6 cm. long; verticils mostly 6-flowered, the ovate bracts abruptly acuminate, 2–2.5 mm. long, the very slender racemes 1–3 dm. long; flowering calyx 2 mm. long, the upper lip truncate (obscurely 3-mucronate), the teeth of the lower ovate, acuminate, not spinose, the compressed lips of the mature calyx scarcely 3 mm. long; pedicels 1.5–2 mm. long; corolla blue, the tube cylindric, 2.5 mm. long, the upper lip concave, erect, 1.5 mm. long, the lower 2.5 mm. long.—Section *Microsphace*, 51; 14.

San Martín: Juanjuí, *Klug 4403*.—Lima: Near Lima, *Mathews*. Chancay, *Ruiz & Pavón*. Viscos, *Pennell 14488*.—Huánuco: Near Huánuco, *Ruiz & Pavón; 2056; 2381*.—Junín: Chanchamayo, *Isern*.—Cuzco: Bank of Urubamba, *West 8022; (Cook & Gilbert 928)*. Much of warmer America.

Salvia oppositiflora R. & P. Fl. Peruv. 1: 26, *pl. 43*. 1798; 30. *S. grata* Vahl, Enum. 1: 244. 1805. *S. strictiflora* Hook. Bot. Misc. 2: 234. 1831. *S. cupheaefolia* HBK. Nov. Gen. & Sp. 2: 288. 1818; 343.

Low (to 5 dm.) sprawling to erect green half-shrub, the sparse indument a crisped puberulence, sometimes slightly viscid on the leaves (these also glabrous), more or less obvious or dense, often glandular on the spikes including, except exceptionally, the calyces; petioles 0.5–2 cm. long; leaves serrulate or serrate, deltoid-ovate (to rarely oblong-lanceolate), sometimes slightly acute at the rounded, scarcely cordate base, acute or subobtuse, often about 2.5 cm. long, 1–3 cm. wide; flowers usually solitary, the caducous obovate or ovate acuminate bracts 12–15 mm. long, the glomerules finally 1–2 cm. distant in strict racemes ordinarily 1.5–2.5 dm. long; pedicels 4–5 mm. long; calyx 1–2 cm. long, type subglabrous, usually not, the lips 3–4 mm. long, acuminate, the lower teeth connate at least medially; corolla rarely yellow, usually red with yellow trichomes, the tube 16–30 mm. long, smooth within, the lips 5–10 mm. long; stamens at the middle of the tube, filaments 2.5–3 mm. long, connective 2– nearly 4 cm. long, the gubernaculum pubescent.—Ambiguous forms occur in Cuzco and Puno, as *Vargas 3140*. A common species, only a few of the many collections made cited; *S. cupheaefolia* HBK. differs only in the glabrous calyces (Epling). Section *Biflorae*, 128; 113. F.M. Neg. 17658; 39443 (*S. cupheaefolia*).

Cajamarca: Callacate, *Jelski*. Bambamarca, *Stork & Horton 10030*.—La Libertad: Huamachuco, *West 8108; 8105*.—Lima: San Mateo, *Isern*. Matucana, *78; 558; Stork & Horton 9130*. Obrajillo, *Cruikshanks* (type, *S. strictiflora*); *Neé*. Río Rimac Valley, *Verne Grant 7483*. Canta, *Pennell 14331*. Río Chillón, *Pennell 14439*.—Huánuco: Chavanillo, 3400–3700 meters, (*Novoa 1078*).—Junín: Near Tarma, *1062; Killip & Smith 21789* (in part, calyx glabrous); *21837; Isern 2075; Constance & Tovar 2401; Ruiz & Pavón*, type; (*Tafalla?*, type, *S. grata*). La Oroya, *960*.—Huancavelica: Pampas, *Stork & Horton 10229*. Mejorada, *Stork & Horton 10898*.—Cuzco: Paucartambo, *Balls 6674*. Rodadero, *Vargas 3154*. San Sebastian, *Pennell 13604; 13608*. Chaspyoc, *Edmund Heller 2171*. Near Cuzco, *Herrera 357*.—Puno: Near Puno, *Soukup 400*. "Chucchu," "nucchu."

Salvia paposana Phil. Fl. Atacam. 39. 1860; 24. *S. rhombifolia* R. & P. var. *glabrior* Benth. Lab. Gen. & Sp. 259. 1833.

Like *S. rhombifolia* at least as to Peruvian specimens but these glabrate, the simple stems and rather many branches soon lustrous, the leaves somewhat ovate and often subacute, sparsely or coarsely crenate; glomerules mostly soon 2–3 cm. distant in spikes often about 1 dm. long but also usually with a pair of short spikes from reduced sessile leaves; calyx in flower and in fruit about 6 mm. long, scarcely more than 3.5 mm. across, sparsely hispidulous and obscurely viscid-glandular; stamen connective 10–12 mm. long (Epling); seeds those of the similar species.—Disposition after Epling but perhaps correctly recorded as a variant of *S. rhombifolia; S. paposana* not seen. Section *Rhombifoliae*, 60; 80.

La Libertad: Prov. Trujillo, 1,240 meters, (*N. Angulo 1917*).—Lima: Ambar, *Stork 11435* (det. Johnston). Asia, *Vargas 9304* (det. Johnston). San Geronimo, *5898*. Santa Clara, *Rose 18611*. Lurín, *Cruikshanks* (type, var. *glabrior*). Lomas de Amancaës, (*Mathews 737*). Hills of Lima, *Isern 2470*. Chile.

Salvia pauciserrata Benth. Pl. Hartw. 241. 1846. *S. calocalicina* Briq. Ann. Cons. Jard. Bot. Genève 2: 159. 1898 fide Math. & Epl. Brittonia 8: 307. 1957; 36.

Glabrous (except puberulent-hispidulous pedicels) perennial, to 1 meter tall; petioles 2–8 cm. long; leaves serrulate, often purplish beneath, ovate or elliptic, rounded or somewhat narrowed and acute at base, acute or acutely acuminate (sometimes; or obtuse?), mostly 9–18 cm. long, 4–10 cm. wide or those below the open spikes considerably smaller; flowers few, the caducous bracts ovate, caudate, to 1 cm. long, the glomerules finally 1.5–6 cm. distant; pedicels 3–6 mm. long; calyx hispidulous villous, 1–1.5 cm. long, in fruit 15–18 mm. long, the acuminate lip 8–10 mm. long, connate below the middle; corolla tube (1.5) 2–4.5 cm. long, binately papillate within at base, the upper lip 10–13 mm. long; stamens below the middle of the tube, the filaments 3–8 mm. long, the connective 36–47 mm. long, jointed at base, the 8 mm. long pubescent gubernaculum dilated into an obscure obtuse tooth; style pubescent.—The Williams collections have tube only 1.5 cm. long (var. *minor* l.c. 85: 128; Epling). Has been collected in the Putumayo region near Peru and Ecuador. Accumulating materials suggest that this section may consist of a single variable species (Epling, Brittonia 7: 133. 1950), *S. derasa* Benth. l.c. (calyx villous) and glabrate states (*S. pauciserrata*). Section *Flexuosae*, 127; 135. Illustrated, Epling, l.c. 110, *pl. 19*.

San Martín: Tarapoto, *Spruce 4330; Williams 6236; 6244.* San Roque, *Williams 7450; 7656.* Zepelacio, *Klug 3322.* To Colombia.

Salvia Pavonii Benth. Lab. Gen. & Sp. 278. 1833; 20.

Resembles *S. punctata* but leaves obscurely few-crenate toward the acute or subacute apex or entire, many 4–5 cm. long, 1.5–2 cm. wide, glabrous except for the puberulent midnerve above and numerous red glands especially abundant beneath; flowers 6–12, the ovate bracts 5 or 6 mm. long; calyx 6 mm. long, densely glandular; corolla lemon-yellow (Stork), the tube 15–16 mm. long, the upper lip 5–6 mm. long, the lower at least as long.—Author noted the yellowish larger corolla; may be, as Epling suggests, a variant of *S. punctata* R. & P., with which it grew at Pillao and with which it comprises the section with oblong gubernaculum of stamen connective assurgently dentate. Section *Punctatae*, 58; 49.

Junín: Huassahuassi, Tarma and Pillao, *Ruiz & Pavón*, type. Palca to Carpapata, 2,900 meters, *Stork 10956.* Tapo, (*Ochoa 296*).

Salvia penduliflora Epl. Repert. Sp. Nov. Beih. 85: 70. 1935; 38.

Type a shrub to 2 meters high, internodes 5–6 cm. long, indument a soft somewhat cinereous puberulence except the membranous leaves soon glabrate above; petioles 2–4 cm. long; leaves acutely serrulate, ovate, obliquely rounded at base, acutely acuminate, 4–10 cm. long, 2.5–6 cm. wide; pedicels 3–6, early recurving in type, 4–5 mm. long, the ovate acuminate promptly caducous bracts 2–3 mm. long, glomerules of the paniculate spikes (these 2–3 dm. long) 1–2 cm. distant; calyx 6 or 7 mm. long, in fruit 9 mm. long, the rounded mucronate upper lip 3 mm. long, the lower teeth acuminate, connate above the middle; corolla white or tinted, the tube 6–7 mm. long, lightly ventricose, smooth within, the upper lip 3.5–4 mm. long, the lower 5 or 6 mm. long; filaments 2 mm. long, connective dilation nearly 3 mm. long and toothed; style shortly exserted, villous above. —May prove conspecific with *S. amplifrons* Briq., Bull. Herb. Boiss. 4: 863. 1896, of Bolivia but for habit; the Cook and Gilbert specimens differ in larger corolla, tube 8–9 mm. long (author); my doubtful specimen has fruiting calyx nearly 9 mm. long, erect, nutlets 2 mm. long, cylindric. The earliest name, depending upon variation-range of characters now accepted to distinguish species here, may be *S. tiliaefolia* Vahl (Ecuador to Venezuela) with corolla tube 3.5–4 mm. long, leaves shortly acuminate, pubescent beneath on veins. Section *Angulatae*, 67; 234.

Huánuco: Muña, *Pearce.* Huacachi near Muña, *3882?*.—Cuzco: Mantoc, Prov. Calca, 2,600 meters, *Weberbauer 7910*, type. San Miguel, Valle de Urubamba, (*Cook & Gilbert 873; 901*). Urubamba at 2,200 meters, (*Vargas 3237*, fide Epling).

Salvia perlucida Epl. Repert. Sp. Nov. Beih. 85: 72. 1935; 39.

Simulates *S. penduliflora* but nearly glabrous, petioles 4–7 cm. long; leaves ovate or elliptic-ovate, unevenly serrate, acutely and sometimes subcaudately acuminate; bracts 3–4 mm. long; calyx nearly glabrous, to 9 mm. long in fruit, perlucid; corolla tube 7–8 mm. long, connective 6 mm. long, toothed, dilation 3.5 mm. long; style sparsely villous dorsally at apex; nutlets 3 mm. long.—The very thin leaves and meager pubescence suggest shade influence; *S. membranicalyx* Epl., 71, of adjacent Ecuador is described as annual, corolla tube 5–6 mm. long, nutlets verrucose, 1.5 mm. long; apparently it is the same as *S. violacea* R. & P., Fl. Peruv. 1: 26, *pl. 43*. 1798, from Guayaquil. Section *Angulatae*, 67; 234.

Ayacucho: Ccarrapa, 1,500 meters, *Killip & Smith 22350*, type.

Salvia plumosa R. & P. Fl. Peruv. 1: 26, *pl. 37*. 1798; 41.

Shrubby, the upper branchlets, petioles (about 1–3 cm. long) and leaves beneath scurfy or floccose-tomentose with branched trichomes, these few and short on the calyces; leaves ovate-lanceolate, cordate or exactly rounded at base, acutely or subacutely acuminate, 5–10 cm. long, 2–3 cm. wide, rather obscurely or minutely crenulate, soon glabrate and rugulose above; flowers 6 in the upper axils, the pedicels finally 2–2.5 cm. long; calyx 2–2.5 cm. long, the lips obtuse; corolla tube 3.5 cm. long, ventricose below the lower lip—this 1.5 cm. long—within (8 mm. above the base) retrorsely bipapillate, the upper lip 12 mm. long.—Section *Leonuroideae*, 97; 304. F.M. Negs. 8302; 17661.

Huánuco: Acomayo, *Woytkowski 34003*.—Junín: Huassahaussi, *Ruiz & Pavón*, (*Dombey 270*), type. "Chenchelcoma."

Salvia praeclara Epl. Repert. Sp. Nov. Beih. 85: 121. 1936; 33.

Shrub, the branches (internodes 2.5–4 cm. long) and calyces glandular hirsute; petioles 3–5 cm. long; leaves unevenly serrate, deltoid-lanceolate, subtruncate at rounded base, very acute, 8–8.5 cm. long, 2.5–4 cm. wide, hispidulous both sides; flowers 3, the promptly caducous bracts ovate, acuminate, 3–4 mm. long, hispidulous, the glomerules finally 1–2 cm. distant; pedicels 3–5 mm. long; calyx 1 cm. long,

in fruit 12–13 mm. long, the upper lip mucronate, the shorter lower teeth acuminate; corolla tube 2.5 cm. long, within above the base with a deltoid hispid appendage, the lips 7–8 mm. long; filaments 9 mm. long, connective 32 mm. long, the dilated part 13 mm. long with an acute tooth 1.5 mm. long; nutlets 4 mm. long.—The author indicates that the corolla tube is not papillose within—a character regarded as basic in contrast to corolla naked within. Said to obtain 2 meters, the flowers red; type, *Pearce 639*, Valle Mecorya, Bolivia. Section *Cylindriflorae*, 118; 117.

Peru (probably). Bolivia.

Salvia pseudorosmarinus Epl. Bull. Torrey Club 68: 557. 1941.

Shrubby, to 6 dm. high, the virgate viscid branches clothed with minute glandular trichomes and larger eglandular crisped ones, villous above, and to the base with short branchlets of fastigiate leaves; petioles 1–3 mm. long; leaves bullate, linear, 1–2.5 cm. long, strongly revolute, truncate or hastate at the base, obtuse, minutely glandular above, villous beneath; flowers solitary in the axils of the upper little modified leaves; calyx (9) 10 mm. long, viscid villous, the upper lip 3-mucronate; corolla deep blue, the tube 1.5 cm. long, the upper lip 5 mm. high, the lower nearly twice as long.—Section *Corrugatae*, 59; 50, but the flowers in upper leaf-axils; the distinctive foliage and dwarf lateral branches simulate those of Rosemary (author).

La Libertad: Open shrubby hillside, 2,900 meters, *Stork & Horton 9968*, type.

Salvia psilantha Epl. Repert. Sp. Nov. Beih. 85: 121. 1936; 33.

Apparently a perennial herb, the internodes to 1.5 dm. long, nearly glabrous including the mature calyces, these 17–18 mm. long (in flower 12–14 mm. long), costate, the lip subulate-acuminate; petioles 2.5–4 cm. long; leaves serrate, broadly ovate or even subrotund, acute, 8–11 cm. long, 6–8 cm. wide; glomerules 1–2 cm. distant, the caducous bracts lanceolate, ciliate, 5–8 mm. long; pedicels 4–6 mm. long; corolla tube cylindric, 27–28 mm. long, smooth within, the upper lip 8–9 mm. long, the lower shorter; stamens at throat, 5–8 mm. exserted; style gibbous.—Section *Cylindriflorae*, 118; 117.

Junín: Parahuanca, 2,400 meters, *Weberbauer 6590*, type.

Salvia psilostachya Epl. Repert. Sp. Nov. Beih. 85: 65. 1935; 26.

Related (fide author) to *S. speciosa* but type a meter high shrub, with the internodes only 1–3 cm. long, the merely tinted corollas

crowded on narrow virgate spikes, these finally 4.5 dm. long; leaves ovate, subcordate, subobtuse, 4.5–8 cm. long, about half as wide, shortly villous, irregularly serrate; pedicels 2–2.5 mm. long; calyx about 1 cm. long, in fruit 1.5 cm. long; corolla tube 1 cm. long, the upper lobe 4.5–5 mm. long, roseate, the lower whitish, 1 cm. wide; stamens long-exserted; connective elongate above the joint, the gubernaculum subentire.—This grayish puberulent semi-shrub seems to be distinct at least from the species with which contrasted; *S. macrostachya* HBK. of Ecuador with large leaves apparently is nearer *S. speciosa* Presl but the calyx is green and villous all over; may be specific characters. Section *Macrostachyae*, 64; 85. Illustrated, Epling, l.c. 110, *pl. 21*.

Cajamarca: Pion, Valle de Marañón, 1,000 meters, *Weberbauer 7141*, type.

Salvia punctata R. & P. Fl. Peruv. 1: 27, *pl. 39*. 1798; 20. *S. mitis* R. & P. l.c.

Straggling shrub, the erect or suberect branchlets toward tip and petioles—these 5–15 mm. long—shortly villous, the indument viscid or glandular in the slender 1–2.5 dm. long spikes; leaves mostly ovate, crenate-serrate, more or less crowded to base, obtuse or subacute, 3–6 cm. long, 1.5–4 cm. wide, villosulous on the rather prominent veins beneath or all over, also punctate, glabrate above; flowers 3–6, the caducous ovate acuminate bracts 3–4 mm. long, the glomerules finally 1–3 cm. distant; pedicels 3–5 mm. long; calyx 5 (–9 in fruit) mm. long, hispid-villous-glandular, the upper lip 3-mucronate, the lower teeth acute; corolla white, lilac or blue, the ventricose tube 8–11 mm. long, smooth within, the lips 4–6 mm. long.—The var. *glabra* Epl. (*S. mitis* R. & P. l.c.), Repert. Sp. Nov. Beih. 85: 58. 1935, is densely glandular punctate, the nodes only hirsute, the leaves more or less acute, glabrous. Section *Punctatae*, 58; 49. Illustrated, Epling, l.c. 110, *pl. 6*. F.M. Negs. 17664; 29076 (both, *S. mitis*).

La Libertad: Prov. Otuzco, 2,650 meters, (*Angulo 0925*); also Cerro Lorenzo, (*0945*). Agallopampa, 3,200 meters, (*López 1043; 1044; Ferreyra 7679*).—Lima: Huariaca, *3113; Mathews 798*. Obrajillo, *Ruiz & Pavón*, (type, *S. mitis*).—Huánuco: Near Huánuco, *2115; Kanehira 294; Mathews 798; Ruiz & Pavón; Mexia 4124* (typical). Near Mito, *3412* (typical); *1661; 1396*. Ambo, *2432*. Acomayo to Carpish, *Mexia 04124*.—Junín: Acobamba near Tarma, *Isern*. Huassahaussi, Tarma and Pillao, *Ruiz & Pavón*, type. "Anasccachu," i.e. Yerba Zorrina.

Salvia revoluta R. & P. Fl. Peruv. 1: 28, *pl. 41* (as *S. linearis*). 1798; 40. *S. acutifolia* R. & P. Fl. Peruv. 1: 24, *pl. 38*. 1798 as to *Dombey 272*, not Lamarck, Ill. Gen. 1: 68. 1791. *S. Macbridii* Epl. Repert. Sp. Nov. Beih. 105: 41. 1938, fide Epling and Mathias.

Virgate flowering branches early puberulent, the internodes about 2–8 cm. long, the many leaves soon green above, canescently floccose-tomentose beneath; petioles 2–4 mm. long; leaves oblong-lanceolate, especially in younger rounded or narrowed at base, subacute, 3–6 cm. long, 4–20 mm. wide, obscurely crenulate, coriaceous, rugulose above; flowers about 3, the ovate acuminate bracts 4–6 mm. long, the glomerules approximate in spikes 5–12 cm. long; pedicels 2–3 mm. long; calyx 11–15 mm. long, or sometimes 16–17 mm. long in fruit, softly canescent and often purplish, the shortly acuminate lips 5–6 mm. long, upper 5–7-veined; corolla tube 13–14 (–23) mm. long, scarcely invaginate within, with 2 papillae, ventricose, and below the lower lip invaginate, the upper lip 5.5–8 mm. long, the lower 6–10 mm. long.—My collections from open shrub about 1 meter high with carmine or purplish-red flowers. Section *Pavonianae*, 95; 279. F.M. Negs. 17631; 8301; 17665.

La Libertad: Prov. Otuzco, (*López 1067*).—Lima: Obrajillo, *Ruiz & Pavón*, type. Cheuchin, *Dombey 272* (type, *S. Macbridii*). Canamaquilla, *Mathews 802*.—Junín: Huariaca, *2407; 3091*.—Huánuco: Yanahuanca, *1190*.

Salvia rhodostephana Epl. Repert. Sp. Nov. Beih. 105: 28. 1938. *S. hastaefolia* Epl. l.c. 85: 63. 1935, not E. Meyer, 1837.

Resembles and perhaps a part of *S. sagittata;* leaves irregularly erose-dentate, sparsely hirsute above, villous especially on the veins beneath; flowers blue, pink or mauve, racemose, the pedicels 2.5–3 mm. long; flowering calyx 6 or 7 mm. long, in fruit 9–12 mm. long, the lobes 4–4.5 mm. long; corolla tube 15–18 mm. long or longer, the upper and lower lobes subequal and about as long; filaments 3 mm. long, connective 4 cm. long or shorter.—Corolla tube 22–25 mm. long, the upper lip 7–9 mm. long, the lower twice as long; stamen connective 3–4 cm. long; corolla pink to blue or pale mauve (from Balls' specimen, Epling). Section *Hastatae*, 62; 88.

Ayacucho: Ocros, Pajonal to Ayacucho, *Balls 6925*. Near Tambillo, *West 3655* (det. Johnston). Huanta, *Killip & Smith 23323*, type; *Pearce*.

Salvia rhombifolia R. & P. Syst. Veg. 347. 1798; Fl. Peruv. 1: 26, *pl. 36, fig. b.* 1798; 23. *S. pilosa* Vahl, Enum. 1: 240. 1804, fide Epling.

Annual a few cm. to several dm. tall, the stem—this simple and often arcuate below—flowering branches and leaves especially beneath more or less puberulent pilose, glabrous or glabrate in age, the spikes, including the calyces, persistingly sometimes purplish glandular pilose; petioles 1–1.5 cm. long, the uppermost pair obsolete; leaves coarsely crenate, subrotund, about 1.5–6 cm. wide; flowers usually 2 or 3, the caducous ovate bracts 1–3 mm. long, the glomerules few in short spikes or few in the axils of reduced sessile leaves on peduncles from the axils of the uppermost pair of subsessile leaves; calyx 5.5–6.5 mm. long, broadly cylindric, in fruit 4–5 mm. across, 8–12 mm. long, the broadly ovate subequal segments shortly acuminate or mucronate, 2–2.5 mm. long; corolla blue or violet, the tube 6–7 mm. long, the upper lip 3.5, the lower about twice as long; stamen connective nearly 1 cm. long, jointed below the middle, the oblong gubernaculum frequently dilating into a small obtuse tooth; seeds nearly round, yellow-brown.—Section *Rhombifoliae,* 60; 80. Illustrated, Epling, l.c. 110, *pl. 9.* F.M. Neg. 17666.

Ancash: Lomas de Mongón, *Goodspeed Exped. 9177.* Lomas de la Chay, *Goodspeed Exped. 9213.*—Lima: Chancay, *Ruiz & Pavón,* type; *Dombey,* (type, *S. pilosa*). Hills of Lima, *Isern 2470.* Hacienda Pativilca, *Raimondi.* Atocongo Lomas, *Goodspeed Exped. 9242; Pennell 14788.* Prov. Huarochiri, *Goodspeed & Weberbauer 33060.* Ancon, *Grant 7467.* Lomas Pasomayo, *Stork & Vargas 9361.* Chicla, *Balls.* San Geronimo, *5905.*—Huánuco: Ambo, *Ferreyra 6580.*—Arequipa: *Raimondi.* Mollendo, *Weberbauer 1472* (det. Loesener); *Johnston 3573; Hitchcock 22421.*

Salvia riparia HBK. Nov. Gen. & Sp. 2: 300. 1818; 19.

Crisply pubescent and above hispid glandular herb with the habit of the generally similar *S. occidentalis;* leaves subhirsute above, often cinereous beneath, 2–3 cm. long; flowers 1–many in verticils, the acutely acuminate bracts 3–3.5 mm. long; spikes 1–2 dm. long; mature calyx 5.5–7 mm. long, the lips spreading, the upper 1–3 mucronate, the lower spinulose, the throat compressed; pedicels 2–3 mm. long; corolla tube 2.5–3 mm. long, the upper lip scarcely 2 mm. long, the lower 3 mm. long; stamens included, the geniculate connective produced into a dilated assurgent tooth; style glabrous, the posterior branch acuminate.—Described originally as a canescent strict highly

redolent herb, the subcordate leaves pilose, especially beneath. Section *Microsphace*, 51; 14. Illustrated, Epling, 110, *pl. 1*. F.M. Neg. 39449.

Piura: Río Chulucanas, Huancabamba to Parano de Guamand, *Bonpland*, type. To Honduras; Venezuela.

Salvia rubrifaux Epl. Brittonia 7: 133. 1950.

Type a perennial herb 1.5 meters tall, sparsely hirtellous toward apex especially on the stem angles, this indument appressed on both sides of the green leaves; petioles 1–2 cm. long; leaves ovate-elliptic, attenuate-acuminate, narrowed at the rounded base, 7–10 cm. long; flowers 3–6 in deciduously bracted verticils, these 1–2 cm. distant in rather lax spikes; calyx 1 cm. long, costate-veined, reddish above, the lips subacuminate; tube of the red corolla 2.5–3 cm. long, gradually ampliate, the lips subequal; stamens about 1 cm. exserted.—A neighbor of the type of the section *Cylindriflorae* (author).

Puno: Carabaya, 2750 meters, (*Vargas 6955*, type, Univ. Calif. at Los Angeles).

Salvia sagittata R. & P. Fl. Peruv. 1: 23, *pl. 35*. 1798; 27.

Tall (to 2.5 meters), branched at base, the upper stems and panicles especially the calyces glandular villous; petioles 2–8 cm. long; leaves unevenly crenulate, notably hastate, acute, 6–20 cm. long, 2.5–12 cm. wide, coriaceous, bullate-rugose and green above, sometimes canescently, sometimes sparsely villous beneath where strongly reticulate-veined; flowers solitary, the caducous bracts ovate, 3–4 mm. long, the glomerules to 1 cm. distant in ample panicles or subcorymbose; pedicels 3–4 mm. long; calyx 4.5–6 mm. long, in fruit 8 mm. long, the lips 2–2.5 mm. long, the upper subtridentate, the lower segments acute; corolla tube 16–18 mm. long, smooth within, the upper lip about 1 cm. long, the lower 12 mm. long; stamens at throat, filaments 2 mm. long, connective 30–34 mm. long, the dilation 7 mm. long.—Ruiz and Pavón noted various supposed medicinal uses; see translation of their journal, Field Mus. Bot. 21: 43. 1940. Section *Hastatae*, 62; 88.

Cajamarca: *Raimondi; (Ferreyra 3176; 3185)*. Socota, *Stork & Horton 10146?*.—La Libertad: Above Cachicadán, *Stork & Horton 9958* (det. Standley, *S. hastaefolia*).—Lima: Matucana and Viso, *565; Weberbauer 183*. Obrajillo, *Mathews 659; Pennell 14419*.—Huánuco: Mito, *1501*.—Junín: Huancayo, *Raimondi*. Tarma, *Raimondi; Ruiz & Pavón*, type. Ocopa, *Killip & Smith 22009*. Huacapistana,

Killip & Smith 24387. La Oroya, *Kalenborn 76.* "Huarmca," "salvia real."

Salvia sarmentosa Epl. Repert. Sp. Nov. Beih. 85: 79. 1935; 37.

Suffrutescent, the virgate or often many and short branches as the interrupted spikes rather obscurely hispidulous and somewhat glandular, the entire leaves glabrous or ciliolate; petioles 1–4 mm. long; leaves nearly oblong, obtuse or subacute both ends, 1–3 cm. long, 3–8 mm. wide; flowers 3, the ovate caducous bracts 3–4 mm. long; glomerules to 1.5 cm. distant, the spikes often foliose at base, a few cm. to 1.5 dm. long; pedicels 3–4 mm. long; calyx about 1 cm. long, little longer in fruit; corolla blue, the tube 8 mm. long, the upper lip 5 mm. long, the lower 7.5 mm. long; filaments 2.5 mm. long; connective nearly 6 mm. long, the dilation obtusely toothed; style villous.—Simulates in leaves and habit *S. integrifolia* R. & P. with longer calyx; both Vargas and Stafford plants differ from type in pubescence and habit; calyx of former 11 mm. long (longer when mature), corolla tube 12 mm. long (Epling). Section *Sarmentosae,* 79; 153; *Flocculosae,* 77; 153.

Cuzco: Cuesta de Seccsecka, 3,800 meters, *Vargas 5763.* Urcos, (*Stafford*). Ollantaitambo, *Pennell 13650,* type; *Cook & Gilbert 375; 376.* Collcha, *Vargas 9738* (det. Standley). Tarapoto, *Vargas 11074* (det. Standley). Prov. Calca, *West 7174.* Chaspyoc, *Edmund Heller.* Huasao, *Herrera 3034.*

Salvia scandens Epl. Repert. Sp. Nov. Beih. 85: 116. 1936; 43.

Ligneous with ample more or less cordate-ovate leaves and bluish-violet flowers; petioles 3–5 cm. long; leaves acutely serrate, cordate to rounded at base, rather abruptly and very acutely acuminate, often 8–16 cm. long, 5–8 cm. wide, green and obscurely puberulent above, early subtomentulose beneath; flowers 3-verticillate; bracts deciduous; pedicels 4–8 mm. long, villous as the interrupted spikes including the calyces, these submembranous, the tube 12–13 mm. long, the shortly acuminate lips 5 mm. long, the upper 5–7-veined; corolla tube 4–4.5 cm. long, gradually ampliate above, 2–4-papillate at base within and laterally bisaccate, the spreading lower lip longer than the upper, this including the stamens; filaments 7 mm. long, connective nearly 3 cm. long, dilated part 12 mm. long; style glabrous, upper branch longer (Epling, Bull. Torrey Club 71: 493. 1944). —Type scandent (perhaps supported in other shrubs); lower lip of the corolla may be the longer; species referable to a new Section

Weberbaueria with papillate corolla tube, longer lower lip of violet corolla (author), who originally included it in *Longiflorae* with query.

Cuzco: Marcapata, 2,900 meters, *Vargas 1330; 9678; Weberbauer 7796*, type.—Puno: Near Limbani, *Metcalf 30489*.

Salvia scutellarioides HBK. Nov. Gen. & Sp. 2: 303. 1818; 28. *S. petiolaris* HBK. l.c. 304.

Lax or more or less procumbent herb said to root at the lower nodes, sometimes 1.5 meters long; petioles 2–10 cm. long; leaves crenate-serrate, mostly deltoid, infrequently cordate, often truncate-subcordate, obtuse to acute, 2.5–9 cm. wide, rather thin, canescently below or sparsely hirsute both sides; flowers opposite in the axils of caducous glandular bracts 4–6 mm. long; racemes long-pedunculate, glandular pilose, the pedicels 4–5 mm. long; calyx sordid glandular, 4.5–6 mm. long, in fruit 7–12 mm. long, corolla tube 10–12 mm. long, smooth within, the upper lip 6–8 mm. long, the lower 8–12 mm. long; stamens at throat, filaments 2.5–3 mm. long, connective 18–33 mm. long, the extended dilation 5–8 mm. long.—Perhaps should be defined to include the more erect *S. macrophylla* Benth. Standley chose the name *S. petiolaris* HBK. Section *Hastatae*, 62; 88. F.M. Neg. 39451.

Huánuco: Toward Pampayacu, *Kanehira 280*. Pillao, *Woytkowski 83*, (*Goodspeed Exped. 34083*). Carpish, *Stork & Horton 9887*. Chaglla, *3654*.—Huancavelica: Salcabamba, *Stork & Horton 10294*.—Ayacucho: Pampalca, 3,200 meters, *Killip & Smith 22245*.—Apurímac: Chincheros, *Stork & Horton 10738* (det. Standley).—Cuzco: Ollantaitambo, (*Cook & Gilbert 346*); *Pennell 13671*. Near Cuzco, *Pentland*. Marcapata, *Vargas 9679* (det. Standley). Abancay, *Soukup 742; Vargas 476*. To Colombia.

Salvia silvarum Epl. Repert. Sp. Nov. Beih. 85: 91. 1935; 40.

Allied to *S. obumbrata* Epl. but a shrub, more or less purplish villous except the sparsely pubescent green leaves; petioles 1.5–2.5 cm. long; leaves serrulate, ovate, rounded-narrowed at base, gradually acuminate, 6–8 cm. long, half as wide; pedicels 5–8 mm. long, the caducous lanceolate bracts 10–12 mm. long; glomerules 1–2.5 cm. distant, the spikes to 2.5 dm. long; calyx about 1.5 cm. long, little longer in fruit, the upper rounded lip mucronate, the lower segments acute, 4–5 mm. long; corolla tube 22 mm. long, binate papillate within, the upper lip 7 mm. high; filaments 4 mm. long, connective 13 mm. long, dilation entire; style glabrous; nutlets 4 mm. long,

mucronate.—The rather similar (vegetatively) *S. hirtella* Vahl of Ecuador has smaller leaves, glabrous except the margins, long-exserted stamens with much longer connective; type by Jussieu "from Peru" but scarcely at present defined, as not collected in modern times. Section *Umbratiles*, 91; 272.

Junín: Pichis Trail, Yapas to Enenas, 1,600 meters, (*Killip & Smith 25612*, type).

Salvia speciosa Presl ex Benth. Lab. Gen. & Sp. 272. 1833; 25. *S. Mathewsii* Benth. l.c. Suppl. 722. 1835; 323.

Stout-stemmed herb or the pithy branches sometimes firm, glabrous or glabrate except at nodes or the flowering stalks and elongating inflorescences more or less glandular pilose; petioles to about a dm. long; leaves membranous, soon glabrate, unevenly serrate, ovate, somewhat cordate, often obliquely, acuminate, the lower ample, the floral to about a dm. long, 7 cm. wide; pedicels finally 1–1.5 cm. long, 3 in each verticil, the rather tardily deciduous bracts about as long as broad, the glomerules continuous except in fruit, when 1–3 cm. distant; calyx about 1.5 cm. long (–2 cm. in fruit), glabrate toward the usually black-purple tip, the upper lip obtuse, the lower teeth acute; corolla dark or red-purple, the tube at least 1.5 cm. long, the upper lip 5–8 mm. long, the lower 10–14 mm. long; filaments 7 mm. long, connective 5–5.5 cm. long, dilated portion about 1.5 cm. long (floral measurements, as elsewhere, after Epling).—*S. Mathewsii* differs especially in that the stems are subglabrous, the leaves at base 1.5 dm. long or longer, the floral subobtuse, racemes 3 dm. long, verticils distant, hirsute pedicels subequal calyx, this colored, hispid at base, glabrous above, 14–16 mm. long, and corolla tube ample, lower lip more than twice as long as upper (author), apparently characters variously developed at different ages. Section *Macrostachyae*, 64; 85. F.M. Neg. 29072.

Lima: Near Obrajillo, *Mathews 660* (type, *S. Mathewsii*); *Pennell 14494*.—Huánuco: Mito, *1599*. Yanahuanca, *1212*. Above Huánuco, *Haenke*, type.

Salvia striata Benth. in DC. Prodr. 12: 343. 1848; 29. *S. adenoclada* Briq. Ann. Cons. Jard. Bot. Genève 2: 155. 1898.

Nearly *S. oppositiflora* but as to type the leaves canescent villous beneath, suggesting those of *S. tubiflora* but rounded-truncate at base and flowers smaller; leaves variable in size and shape but typically ovate, subobtuse or acute, to about 5 cm. long, 3 cm. wide, gla-

brate and scarcely or not rugulose above, in the southern specimens half as large or smaller, rugose-bullate above, densely crenulate; bracts 5–8 mm. long; calyx about 1 cm. (type) –12 mm. long, scarcely or shortly glandular; corolla tube 2 cm. long (–2.5 cm.), upper lip 6 (–10) mm. long; stamens at middle of tube, connective 26–33 mm. long, gubernaculum 10–12 mm. long, pubescent. Floral data from Epling, who noted: the Cuzco plants are remarkably similar to Mathews.'—Meyen suggested a name for his plant which seems to be represented by all the specimens from southern Peru, some of which approach *S. oppositiflora* R. & P.; these may be separable or represent one species, since *S. striata* may be an inner valley form of *S. tubiflora*. In fields everywhere; common eastward to Cuzco (Stork & Horton). Section *Biflorae*, 128; 113. F.M. Negs. 29111; 29103; 17669 (*Meyen*).

Cajamarca: Caspan, 2,240 meters, (*M. Vargas & A. Novoa 2237*). —La Libertad: Prov. Otuzco, 35–500 meters, (*Redoutt 0429*). Prov. Calendín, 1,860 meters, (*Redoutt 6430*).—Amazonas: Chachapoyas, *Mathews 3155*, type (also type, *S. adenoclada*).—Apurímac: Pincos, 2,700 meters, *Stork & Horton 10667*. Saihuiti, *Balls 7023*.—Cuzco: Calca, 3,000 meters, *Herrera 2087; Vargas 3140*. Ollantaitambo, *Cook & Gilbert 398; 1210*.—Arequipa: High pampa, *Meyen*.

Salvia styphelus Epl. Repert. Sp. Nov. Beih. 105: 22. 1938. *S. radula* Epl. l.c. 85: 60. 1935, not Bentham, 1848.

Resembles *S. bullulata;* petioles 1–3 mm. long; leaves deltoid-ovate, truncate at base, subobtuse, 8–12 mm. long, 6–9 mm. wide, crenate, nearly glabrous above, canescent tomentulose beneath; flowers 1–3, the ovate bracts 1–2 mm. long; glomerules 2–5 mm. distant, often approximate in short lateral spikes; calyx glandular villous, 8 mm. long, the pedicels 3 mm. long; corolla tube blue, 13–15 mm. long; otherwise apparently like the relative.—Section *Corrugatae*, 59; 50. Illustrated, Epling, l.c. 110, *pl. 6*.

Peru(?): Without data, (*Lobb*, type, Kew).

Salvia Tafallae Benth. Lab. Gen. & Sp. 260. 1833; 23.

Annual, commonly with 2 or 3 pairs of arcuate branches arising from near the base of a central erect stem several dm. tall, glabrous or glabrate below, more or less shortly pilose-hispidulous with mostly gland-tipped trichomes, especially on the elongating spikes; lower petioles 1–2 cm. long, the uppermost 5 mm. long or shorter; leaves broadly ovate, truncate or subcordate, rounded or subobtuse, coarsely

or few crenate, mostly 2–3.5 cm. long, 1.5–3 cm. wide, sparsely and minutely hispidulous above, pilosulous beneath, especially on the veins; flowers several, bracts often tardily caducous, rotund-ovate, apiculate, ciliate and appressed pilose, about 5 mm. long; calyx about 7 mm. long, in fruit 8–9 mm. long, the acute teeth subequal; seeds ellipsoid, about 2 mm. long.—Otherwise presumably like the characteristically coastal species, *S. rhombifolia* R. & P., in which Epling perhaps correctly included it; it seems, however, better marked than *S. paposana* Phil., at least as to Peru. Section *Rhombifoliae*, 60; 80. F.M. Neg. 17674.

Lima: Río Blanco, 3,000 meters, *Killip & Smith 21646; 21691; 21760.* Matucana, *361; 442.*—Junín: Tarma, *Tafalla*, type; *Killip & Smith 21804.* Acopa, *Killip & Smith 21982.* Huancayo, *Soukup 1994; Killip & Smith 22140.*—Apurímac: Chincheros, *Stork & Horton 10780.*—Cuzco: Paucartambo, *Vargas 903; Herrera 1062; Balls B-6794.* Chicon, *Vargas 11082.* Checacupe, *Pennell 13531.* Bolivia; Chile?

Salvia tiliaefolia Vahl, Symb. Bot. 3: 7. 1794; 72 (Beih. 85).

Glabrate annual a few dm. to a meter tall or taller, the upper stems, leaves especially on the veins beneath, and calyces sparsely crisped hispidulous, the calyces only on the nerves; petioles 2–6 cm. long; leaves membranous, broadly crenate, rounded-ovate, mostly subtruncate or shortly cuneate at base, acute or shortly acuminate, ordinarily 4–7 cm. long or larger; flowers 3–12, bracts caducous, glomerules 1–2 cm. distant, the long spikes frequently paniculate; calyx typically 4.5–5.5 mm. long, finally 5.5–9 (generally 7–7.5) mm. long; corolla blue, the tube 3.5–4 mm. long, the upper lip 1–2 mm. long, the lower 2–2.5 mm. long; stamen cells partly exserted.—The Peruvian plant is essentially glabrous except the petioles, leaf-bases and spikes, and the violet corolla tube is nearly 1 cm. long, the subequal lips 4–5 mm. long; it does not seem to be exactly any of the many segregates proposed for Ecuador so probably represents a new species or that of Vahl is variable. Section *Angulatae*, 67; 234.

Tumbez: Southeast of Hacienda La Choza, *Weberbauer 7710.* To Colombia and Venezuela.

Salvia trifilis Epl. Bull. Torrey Club 68: 560. 1941.

A perennial herb with ascending sparsely pubescent eglandular stems, the rachis of the long interrupted spikes (1.5–2 dm.) and the calyces also glandular; petioles 1–2.5 cm. long; leaves ovate, rounded

or possibly subcordate at base, subacute, 3–5 cm. long, 2–3.5 cm. wide, sparsely hirsute above with simple or in part branched trichomes, the former absent in the canescent subtomentose indument beneath; bracts caducous; glomerules about 6-flowered, 1–2.5 cm. distant; calyx 6 mm. long, the rather spreading lobes acute; tube of the blue corolla epapillate, 6.5 mm. long, the upper lip 3.5 mm. wide. —Belongs to the *Flocculosae* but simulates *S. cuspidata* R. & P. with different stamen structure and branched pubescence (author).

Cajamarca: Sucse Río, Socota, 2,800 meters, *Stork & Horton 10105*, type.

Salvia tubiflora J. E. Sm. Pl. Icones Ined. fasc. 2: *pl. 26*. 1790; 325; 24. *S. biflora* R. & P. Fl. Peruv. 1: 24, *pl. 38, fig. a*. 1798. *S. excisa* R. & P. l.c. 25, *pl. 36, fig. a*. *S. biflora* R. & P. var. *glabrata* Benth. Lab. Gen. & Sp. 279. 1833. *S. scrobiculata* Meyen ex Benth. in DC. Prodr. 12: 325. 1848.

Suffrutescent, the lax elongating branches toward apex, petioles (1–3 cm. long), leaves beneath, and racemes including the calyces (15–17 mm. long) more or less white villous-lanate, scarcely or not viscid-glandular; leaves mostly cordate-ovate or the upper subtruncate, obtuse, unevenly and coarsely crenate, green and glabrate above unless on principal nerves, the mature to about 8 cm. long, 5 cm. wide, not much reduced above; flowers solitary (–3), the caducous ovate acuminate bracts about 1 cm. long; pedicels 5–7 mm. long, each pair about 1 cm. distant; calyx mucronulate, segments acuminate, 5 mm. long; corolla red, the tube 3–3.5 cm. long, little ampliate, smooth within, the upper lip 1 cm. long, the lower shorter; stamens at middle of tube, connective 33–42 mm. long, gubernaculum 13–16 mm. long (measurements as elsewhere, Epling's).—Probably the variety is typically restricted to lomas; *S. squalens* HBK. of Ecuador is similar but very glandular. Has been collected often near Mollendo, as by Meyen who gave a name (in his Reise 2: 45. 1835) to his specimens. Section *Biflorae*, 128; 113. F.M. Neg. 17675 (*S. biflora*).

La Libertad: Prov. Trujillo, 600 meters, (*Angulo & López 0684*). —Ancash: Lomas de la Chay, *Goodspeed Exped. 9202*.—Lima: Prov. Chancay, *Ruiz & Pavón*. Huanca, (*Dombey*, type, Brit. Mus., fide Epling). Huara near Chancay, *Ruiz & Pavón* (type, *S. biflora*). Atocongo lomas, *Pennell 14773; West 3620*. Matucana, *Goodspeed 11327*. Barranco, *Weberbauer 5702*.—Apurímac: Abancay, *Soukup 803*. Infiernillo, *Goodspeed Exped. 11521*.—Cuzco: Prov. del Cercado, (*Herrera 48*).—Arequipa: Near Mollendo, *Weberbauer 1457;*

West 8209; Johnston 3574. Islay, *Worth & Morrison 15718.* Atiquipa, *15667; Ruiz & Pavón,* type, *S. excisa;* also *S. biflora,* var. *glabrata*). Near Islay, (*Meyen*). Pampa Grande, *Meyen.* Chile.

Salvia tubulosa Epl. Repert. Sp. Nov. Beih. 85: 115. 1936; 42.

Shrub, the branches (internodes 5–10 cm. long), leaves beneath, bracts and calyces, these at base, villous; leaves petioled, coarsely crenate, broadly ovate, narrowed at subcordate base, shortly acuminate, 7–13 cm. long, 4–8 cm. wide, glabrous above; flowers 3–6, the caducous ovate-caudate bracts 2–2.5 mm. long, the glomerules finally to 1 cm. distant; calyx about 12 mm. long, the upper lip rounded, the lower teeth acute, connate below the middle; corolla tube 3–3.5 cm. long, cylindric, smooth within, the upper and lower lips 10–12 mm. long; filaments at throat, 4 mm. long, connective 17 mm. long, dilation obscurely extended; style glabrous.—Section *Longiflorae,* 115; 310.

Huánuco: Pozuzo, (*Pearce,* type, Kew).

Salvia Vargasii Epl. Bull. Torrey Club 74: 514. 1947.

Sarmentose shrub 1 meter tall, the slender branches and calyces minutely hirtellous and sessile glandular, the internodes mostly shorter than the serrate leaves; petioles 3–4 mm. long; leaves narrowly ovate, more or less truncate at base, subobtuse, 1–1.5 cm. long, rather thin, sparsely hirtellous above, sessile glandular beneath; flowers few, approximate, in racemes 2–3 cm. long, the bracts caducous; calyx 6 mm. long, little enlarged in fruit, the upper lip shortly mucronate; corolla cyaneous, the tube 14 mm. long; stamen connective subentire; style nearly glabrous.—Aspect of *S. fruticulosa* Benth. of Mexico but notably larger flowers; foliage of *S. Gilliesii* Benth. (Bolivia, Argentina) but anthers much reduced, connective subentire, and therefore might be sought in key to sections in *Flocculosae* (author).

Cuzco: Grau, near Karirancka, (*Vargas 5834,* type).

Salvia vestita Benth. in DC. Prodr. 12: 346. 1848; 115.

Shrub(?), densely hirsute villous even to the calyces, the trichomes on the branches drying reddish, 2–3 mm. long; petioles 2–4 cm. long; leaves cordate, subacute, serrate-crenate, 5–7 cm. long, 4.5–6 cm. wide; flowers 3, the persisting(?) bracts rotund, 1.5–2 cm. wide, the glomerules finally 1.5–3 cm. distant; calyx in flower about 17 mm. long, the rounded upper lip mucronate, the lower teeth shortly acu-

minate, connate below the middle; corolla tube 5 cm. long, cylindric, smooth within, the subequal lips 1.5 cm. long.—Section *Longiflorae*, 115; 310.

Peru(?): (*Lobb*, type, Herb. Kew).

Salvia Weberbaueri Epl. Repert. Sp. Nov. Beih. 85: 117. 1936; 50.

Flexuosely or laxly branched shrub, the younger parts more or less densely hirtellous or subvillous but soon green; petioles 1–2.5 cm. long; leaves serrate, ovate- or oblong-elliptic, rounded or subacute at base, acuminate, 1–2 dm. long, 3.5–5 cm. wide, the upper subtending the lax inflorescences; pedicels fewer than 6, to 9 mm. long; calyx 1 cm. long, to 12 mm. (1.5 cm.) long in fruit, the 7-veined upper lip acuminate; corolla tube 3.5 cm. long, smooth within, gradually ampliate, the upper lip about 12 mm. long, the lower little longer; stamens at throat, filaments 4 mm. long, connective 21 mm. long, dilated area not extended; style sparsely pilose.—Section *Longiflorae*, 115; 310; Bull. Torrey Club 71: 493. 1944 as section *Weberbaueria* Epling.

Junín: Río Masamerich, 3,200 meters, *Weberbauer 6638*, type.

11. ROSMARINUS L.

Rosemary has the calyx of *Salvia*, the lateral lobes of the corolla erect and somewhat contorted, the 2 stamens protruded and 1-celled but with a short tooth-like appendage on the filament below the middle.

An important seasoning to many good cooks in the preparation of chicken or rabbit and a number of soups.

Rosmarinus officinalis L. Sp. Pl. 23. 1753.

Shrub with linear tightly revolute entire leaves, canescent beneath, the white or purplish flowers in short axillary racemes; corolla tube little exserted; calyx campanulate, the upper lip entire, the lower bifid; corolla lobes subequal, the upper emarginate, the lower trifid.

Huancavelica: Near Yauli, shrub-land in ravine, 3,500 meters, *Stork & Horton 10226*. Chile to Colombia.

12. SCUTELLARIA L.

Reference: Epling, University of California Publ. Bot. 20: 1–146. 1942.

Herbs or half-shrubs with small leaves and axillary flowers, these with a helmet-shaped calyx, the upper of the equal entire lips usually with a hump or transverse squama (scutellum) and a corolla with the usually galeate upper lip ordinarily somewhat joined to the lateral lobes of the lower. Anthers of lower stamens 1-celled. Nutlets ovoid, rarely obpyriform, variously sculptured or squamate, infrequently lacerate-angulate, always on a columnar gynobase.—Peruvian species ligneous or perennial herbs or half-shrubs with rather stout fascicled roots, except *S. agrestis* St. Hil. May be that sometimes too much importance has been placed upon the size of the flowers unless supported by concomitant characters in specific interpretations; Epling revised in 1942 his earlier sectional and specific keys.

S. albo-rosea Lem., Ill. Hort. *pl. 584*, and *S. Ventenatii* Hook., Bot. Mag. *pl. 4271*, are probably cultivated as ornamentals; the former has undulate leaves, lilac-purple racemose flowers, the latter angled dentate leaves, scarlet flowers.

KEY TO SCUTELLARIA (after Epling)

Flowers ordinarily in the axils of reduced leaves.

Lips of mature calyx subequal, conic-concave, the upper not compressed.

Flowers scarlet; nutlets angled or papillose.

Leaves subglabrous except veins beneath hirtellous; nutlets erose-angled.

Corolla tube 12–14 mm. long ..... *S. ocymoides.*

Corolla tube 7–8 mm. long ..... *S. Perilomia.*

Leaves hirsute especially beneath; nutlets not angled, papillose ..... *S. volubilis.*

Flowers yellow; nutlets verruculose ..... *S. Benthamiana.*

Lips of mature calyx unequal, the lower subplane, the upper impressed to form an erect transverse scutellum.

Leaves, especially the upper, white tomentose beneath. *S. tomentosa.*

Leaves sparsely appressed hirtellous or if densely short-pubescent not canescently.

Corolla tube 9 mm. long; leaves shortly spreading pubescent beneath ..... *S. gardoquioides.*

Corolla tube 10–13 mm. long; leaves sparsely appressed hirtellous beneath ..... *S. Benthamiana.*

Flowers in axils of small deciduous bracts, sometimes 3 or 4.

Corolla usually some tone of blue, rarely white; tube 5–12 mm. long.

Corolla 6.5–8 mm. long; stamens near base of tube..*S. agrestis.*

Corolla rarely shorter than 10 mm.; stamens at least about 6 mm. above tube base.

Leaves obtuse, to 6 cm. wide; racemes glandular.*S. leucantha.*

Leaves acute or acuminate, to 3.5 cm. wide; racemes eglandular.....*S. breviflora.*

Corolla usually some tone of red; tube 18–20 mm. long.

Corolla tube about 3 cm. long; petioles 2.5–6 cm. long. *S. speciosa.*

Corolla tube about 2 cm. long.

Leaves subglabrous, veins beneath puberulent, the trichomes crisped.....*S. atriplicifolia, S. coccinea.*

Leaves pubescent beneath, the trichomes straight.

Indument softly long-hirsute; petioles 3–4 cm. long. *S. Hookeri.*

Indument short-hirtellous, dense; petioles usually shorter than 1 cm.....*S. irrasa.*

SUPPLEMENTARY KEY

Flowers in an at least early bracteate inflorescence, usually soon as long as or longer than the little reduced upper leaves.

Leaves densely and softly pubescent beneath.....*S. Hookeri.*

Leaves shortly barbate, the trichomes firm.....*S. irrasa.*

Leaves glabrate to puberulent beneath, especially or only on the nerves.

Flowers white to purplish, to 1.5 cm. long.

Leaves mostly about 3 cm. wide; flowers blue or violet.

Calyx 1.5 mm. long, corolla 6–8 mm. long, blue..*S. agrestis.*

Calyx 2.5 mm. long, corolla 1–1.5 cm. long, violet. *S. breviflora.*

Leaves mostly 4 to several cm. wide; flowers white or tinted. *S. leucantha.*

Flowers red to purple-red, at least 2 cm. long.

Petioles 2.5–6 cm. long.....*S. speciosa.*

Petioles 1.5–3 cm. long.....*S. atriplicifolia, S. coccinea.*

Flowers mostly or all in the axils of reduced leaves, these sometimes bracteiform, especially the uppermost.

Leaves entire or subentire; scutellum concave; flowers yellow; nutlets verruculose.

Internodes several cm. long; leaves 1–2.5 cm. long; calyx (in flower) 3–4 mm. long.....*S. Benthamiana.*

Internodes about 2 cm. long; leaves 6–12 mm. long; calyx about 2.5 mm. long.....*S. gardoquioides.*

Leaves conspicuously crenate; flowers red.

Leaves glabrous or nearly; nutlets erose-angled.
S. Perilomia, S. ocymoides.

Leaves more or less villosulous beneath; nutlets acutely papillose.

Calyx lips unequal, scutellum concave, erect....*S. tomentosa.*

Calyx lips subequal, scutellum obscure.....*S. volubilis.*

Scutellaria agrestis St. Hil. ex Benth. Lab. Gen. & Sp. 428. 1834; 100.

Branching at base, the procumbent-ascending stems to 2.5 dm. tall, puberulent with spreading trichomes; petioles 8–12 mm. long; leaves cordate, suborbicular, obtuse, 2–3.5 cm. wide, sinuate-dentate, subglabrous above (the scattered trichomes appressed), puberulent on the veins and usually purplish beneath; racemes ordinarily 3–4 cm. long; flowers subopposite, sometimes 3–4 in axils of persistent spatulate bracts; pedicels about 2 mm. long; calyx early 1.5 mm. long, hirtellous, the lower lip finally 4–4.5 mm. long and the scutellum 5 mm. high; corolla blue, 6.5–8 mm. long, the tube 5–6 mm. long, the lower stamens about 2.5 mm. above the base; nutlets not described.—After Epling (as all descriptions), who notes: probably perennial, the roots fascicled. Standley referred the Peruvian plant to *S. purpurascens* Sw., typically Caribbean, the corolla tube 7–9 mm. long, the lower stamens at 6.5–8 mm. above the base (Epling).

Loreto: Río Huallaga, *Williams 4497*. Río Nanay, *Williams 446*. San Salvador, *Williams 1556*. Pebas, *Williams 1826*. Ecuador; Brazil; Trinidad.

Scutellaria atriplicifolia Benth. Bot. Reg. 18: *pl. 1493*. 1832; 126.

Stems several dm. tall, puberulent toward the apex with curled sometimes spreading capitate-glandular trichomes; petioles 1–3 cm. long; leaves broadly ovate, slightly acuminate or subobtuse, rounded at base, 4–9 cm. long, 2.5–5 cm. wide, sinuate-subserrate or entire, glabrous or sparsely hirtellous above, finely so beneath on the veins and often purple; racemes 5–10 cm. long, shortly hirtellous including the calyces, these 2.5–3 mm. long, the lower lip finally 3.5–4 mm. long and the scutellum 4.5 mm. high; pedicels 4.5 mm. long; corolla reddish-purple, the tube 18–22 mm. long, gradually ampliate.

Huánuco: Pozuzo, *4554*. Tingo María, *Stork & Horton 9459; 9511* (det. Standley, *S. irrasa*).—Junín: La Merced, *Killip & Smith 23585*. To Santa Rosa, *Killip & Smith 26132*. Near Perené Bridge, *Killip & Smith 25353*.—Ayacucho: Kimpitiriki, Río Apurímac, *Killip & Smith 22879*. Ecuador.

Scutellaria Benthamiana (Mansf.) Epl. Repert. Sp. Nov. Beih. 85: 179. 1936; 130. *Perilomia Benthamiana* Mansf. Notizbl. Bot. Gart. Berlin 9: 285. 1925.

Fragrant intricately branched shrub, to a meter tall, the angled branches, leaves beneath and calyces appressed hirtellous; petioles 3–5 mm. long; pedicels 2–3 mm. long (–6 in fruit) in axils of upper reduced leaves of short branchlets; leaves subentire, ovate, rounded at base, obtuse, nearly glabrous above, 1–2.5 cm. long; calyx 3–4 mm. long, in fruit the lower lip 5–5.5 mm. long and subequaling the scutellum; corolla sulphur yellow, the tube 10–13 mm. long, hirsute within at the base of the stamens, the lower of these 3–4 mm. above the base, the upper with small appendages near the base; nutlets verrucose.—May be a variant of *S. gardoquioides*. F.M. Neg. 32925 (*Jelski*, ined. name).

Cajamarca: Between Río Tabaconas and Río Marañón, *Weberbauer 6164*, type. San Miguel, (*Weberbauer 3900*). Callacate, *Jelski 113*.—Amazonas: Dunia to Chachapoyas, (*Raimondi*).—Cuzco: Cerro Huancaro, (*Vargas 9983*, det. Mathias). Urubamba, (*Vargas 8118*, det. Mathias).

Scutellaria breviflora Benth. Bot. Reg. 18: *pl. 1493*. 1832; 102.

Perennial, the thick roots fascicled, the erect stems spreading puberulent, 2–4 dm. tall; petioles 1–2 cm. long; leaves ovate, only subcordate, sometimes subcuneate, the uppermost rounded-truncate at base, all acute or acuminate, 2.5–6 cm. long, 1.5–3.5 cm. wide, sinuate-dentate, glabrate or with a few appressed jointed trichomes

above, puberulent on veins beneath; racemes ordinarily 5–10 cm. long; flowers sometimes in 3's, the persisting spatulate bracts 2–4 mm. long; pedicels 3–4 mm. long; calyx sparsely hirtellous; flower to 2.5 mm. long, the lower lip finally 5 mm. long, the scutellum 4 mm. high; corolla violet, 13–15 mm. long, the tube hirtellous within; nutlets black, acutely mammillate.—As *S. agrestis* St. Hil. closely related to *S. purpurascens* Sw. and intermediate species, chiefly distinguished by habit (Epling).

Peru: (*Ruiz & Pavón*, type, without data, Univ. of Oxford). To Venezuela and Argentina.

Scutellaria coccinea HBK. Nov. Gen. & Sp. 2: 325. 1817; 125.

Maybe should be drawn to include the similar *S. atriplicifolia*, that, according to Epling, with broadly ovate leaves, those of this plant, typically Colombian, tending to oblong or elliptical, the flowers crowded in racemes 3–6 cm. long.—If *S. atriplicifolia* Benth. is specifically distinct the following collection is from the area of Bentham's species.

Huánuco: Cayamba near Tingo María, (*Ferreyra 1876*, apparently, Epl. & Math. Brittonia 8: 301. 1957).

Scutellaria gardoquioides (Benth. & Hook.) Benth. in DC. Prodr. 12: 430. 1848; 130. *Perilomia gardoquioides* Benth. & Hook. Gen. Pl. 2: 1203. 1876.

Intricately branched shrub, the branchlets and leaves beneath more or less canescent with short spreading trichomes; petioles 3–4 mm. long; leaves ovate or oval, rounded both ends, subentire, 6–12 mm. long, (type) sparsely hirtellous above; pedicels bibracteolate, 2–3 mm. long, in the axils of the small upper leaves on the short branchlets; calyx 2–5 mm. long, hirtellous, in fruit the lower lip 3–3.5 mm. long, the upper about 3 mm. high; corolla yellow (probably red?) the gradually ampliate tube yellowish-hirsute, 9 mm. long, hirsute at stamen-base; lower stamens about 3 mm. above tube-base, the upper appendaged near the base, hirsute above; nutlets verrucose.

Cajamarca: Sucse Valley, *Stork & Horton 10098*. Chota to Bambamarca, *Stork & Horton 10034* (det. Standley).—Amazonas: Chachapoyas, *Mathews*, type.—La Libertad: Huanchuco, *West 8087*. Otuzco, (*Ferreyra 7635*, det. Mathias with query; leaves to 2.5 cm. long).—Ancash: Llata, *2246*.—Ayacucho: Huanta, *Weberbauer 7592*. —Apurímac: Abancay, *Vargas 9622*.—Cuzco: Paruro, *Vargas 441*.

Scutellaria Hookeri Epl. Repert. Sp. Nov. Beih. 85: 178. 1936; 126. *S. villosa* Hook. Bot. Mag. 80: *pl. 4789.* 1854, not Elliott, 1824.

Stems in type 2–3 dm. tall, pilose or villous as the leaves both sides and the dense racemes with rather long more or less spreading trichomes; petioles 3–4 cm. long; leaves ovate, rounded at base, subobtuse, 6–10 cm. long, 3.5–6 cm. wide, obscurely sinuate-dentate; bracts oblong-lanceolate, ciliate, subpersistent; calyx 3.5 mm. long, sparsely spreading pilose, the lower lip in fruit 4.5–5 mm. long, the scutellum about 6 mm. high; corolla scarlet, the gradually ampliate tube to 22 mm. long; nutlets papillate.—The pubescence, "copious long spreading white hairs," is unique in South American species; the type was grown from seeds (author).

Huánuco: Pampayacu, *Poeppig 1535*, type. Colombia?

Scutellaria irrasa Epl. Repert. Sp. Nov. Beih. 85: 177. 1936; 125.

Stems simple, canescent as the leaves both sides, with short spreading conical scarcely glandular trichomes; petioles 6 to (rarely) 10 mm. long; leaves broadly ovate, rounded or subcordate at base, subobtuse, 3–5 cm. long, sinuate-subserrate; racemes 1–1.5 dm. long, opposite or subverticillate, the lanceolate bracts deciduous; pedicels 2–2.5 mm. long; calyx hirtellous, 3 mm. long, the lower lip and scutellum at maturity 5 mm. long; corolla reddish-purple, the tube 18–22 mm. long; nutlets tuberculate.—Also collected at Cormillo by Pearce (Epling).

Huánuco: Huacachi near Muña, *4086*, type.

Scutellaria leucantha Loes. Verh. Bot. Ver. Brandenb. 47: 187. 1905; 104.

Stems glandular hispidulous above, to 3 dm. tall, the simple glandular racemes 3–10 cm. long; petioles 2–3.5 cm. long; leaves ovate, more or less cordate and obtuse, 7–12 cm. long, 2.5–6 cm. wide, scattered pubescent above, hirtellous on veins beneath; bracts ovate-lanceolate, tardily deciduous; pedicels 4–5 mm. long; calyx hirtellous, 2 mm. long; corolla 1.5 cm. long, the tube white, the galea pale rose or violet.—Fruit unknown. In Ecuador apparently sometimes eglandular (Epling).

Loreto: Río Itaya, *Killip & Smith 29349; 2950; 29772; Williams 3390.* Iquitos, *Williams 7945.* Río Mazán, *José Schunke 284.* Ecuador; adjacent Brazil. "Oriso" (Williams).

Scutellaria ocymoides (HBK.) Epl. Repert. Sp. Nov. Beih. 85. 178. 1936; 131. *Perilomia ocymoides* HBK. Nov. Gen. & Sp. 2: 328. 1818; 432. *P. Weberbaueri* Mansf. Notizbl. Bot. Gart. Berlin 9: 283. 1925, fide Epling.

A half shrub, probably diffuse or subscandent, the slender purplish marginate branches hirtellous; petioles slender, 5–8 mm. long; leaves ovate or rotund-ovate, rounded at base, shortly acuminate, serrate-crenate, the medium 3–4 cm. long, all glabrous above, hirtellous on the veins beneath; flowers opposite in axils of entire reduced leaves, disposed in panicled racemes; pedicels 1–2 mm. long; calyx purple, hirtellous, the lips subequally concave, finally 6–7 mm. long; corolla scarlet, hirsute, the recurved-ascendant tube 12–14 mm. long, pubescent at stamen-base, this about 5 mm. above tube-base and pilose below the middle; nutlets lacerate-dentate angled.—F.M. Neg. 39454.

Lima: Canta, *Pennell 14354*. Chillon near Obrajillo, *Pennell 14323*. Matucana, *199*.—Ayacucho: Marquinia to Mancona, *Weberbauer 53*. Coracora, *Weberbauer 5813* (type, *P. Weberbaueri*). To Colombia; Argentina.

Scutellaria Perilomia Epl. Repert. Sp. Nov. Beih. 85: 178. 1936; 132. *Perilomia scutellarioides* HBK. Nov. Gen. & Sp. 2: 327, *pl. 157*. 1818; 432.

Similar to *S. ocymoides* and perhaps a variant but petioles 8–12 mm. long, pedicels 2–3 mm. long, calyx 3–3.5 mm. long, the lips in fruit 5.5–6 mm. long, corolla tube only 7 or 8 mm. long, the stamens about 3 mm. above the base.—As remarked by me elsewhere the use of a specific name repeating the sense of the generic is contrary to intelligence; Epling's change of the original name to avoid a repetitive combination as he states has natural and therefore permanent validity.

Piura: Palambla, (*Soukup 4285*).—Cajamarca: Near Cajamarca, (*Ferreyra 3177*).—La Libertad: Hacienda de Chuquesonga, *Raimondi*. To Colombia.

Scutellaria speciosa Epl. Repert. Sp. Nov. Beih. 85: 175. 1936; 125. *S. aurata* Lemaire, L'Illus. Hort. 10: *pl. 368*. 1863?

Several dm. tall, the nearly simple stems glandular especially above with short spreading trichomes; petioles 2.5–6 cm. long; leaves ovate, rounded to subcordate basally, obtuse, 8–10 cm. long, about half as wide, sinuate-dentate, dark green and glabrous above except

for some scattered appressed trichomes, paler and finely hirtellous on veins beneath; racemes dense, 5–10 cm. long, the somewhat persisting bracts linear-lanceolate; pedicels 4–6 mm. long; calyx glandular, 4 mm. long, finally with the lower lip 6.5–7 mm. long and the scutellum 6 mm. high; corolla scarlet, nearly straight, gradually ampliate, the tube about 3 cm. long.—Seemingly a phase or local species restricted to the Tarapoto area, as in the case of many plants in other groups.

San Martín: Pongo de Chilcayo, Tarapoto, *Ule 6580*, type. Pongo de Cainarachi, *Ule 6580b; Klug 2737*. Near Tarapoto, *Spruce 4050; Williams 6778*. San Roque, *Williams 7805; 7807*. Tocache, *Poeppig 1925*. Juanjuí, *Klug 4236*.—Huánuco: Tingo María, *Allard 20711* (det. Lyman Smith).

Scutellaria tomentosa (Benth.) Epl. Repert. Sp. Nov. Beih. 85: 179. 1936; 130. *Perilomia tomentosa* Benth. Lab. Gen. & Sp. 446. 1834; 432.

More or less shrubby, the slightly marginate branches especially toward the tip white tomentose as the petioles (2–5 mm. long), leaves beneath and flowering calyces, these about 3 mm. long, glabrous within, the upper lip in fruit forming an erect scutellum; leaves ovate, rounded to subcordate at base, obtuse or the subentire upper subacute, the lower crenate-serrate, 1–3 cm. long, about 2 cm. wide; pedicels about 1 mm. long, opposite in the upper axils; lower stamens 2.5 mm. above the base of the tube; nutlets acutely papillose.

Lima: Cheuchin, *Ruiz & Pavón* (*Dombey*), type.

Scutellaria volubilis HBK. Nov. Gen. & Sp. 2: 325. 1818; 431; 128. *Perilomia Briquetiana* Mansf. Notizbl. Bot. Gart. Berlin 9: 284. 1925, fide Epling. *P. palamblaensis* Mansf. l.c., fide Epling.

A half-shrub, sometimes a meter tall, the many branches, leaves and calyces spreading hirsute, sparsely so on the rugose leaves above or these even subtomentose beneath, rather ovate, rounded- or cuneate-truncate at base, obtuse or rounded at apex, 1.5–3 cm. long; flowers opposite in axils of reduced leaves of lateral branches, these 2–3 cm. long; pedicels 2.5–3 mm. long, equaling the calyx, this with subequal lips finally 3.5–4.5 mm. long, the upper not scutellate; corolla scarlet, the hirsute tube 15–18 mm. long, densely pilose around base of stamens, the longer pair at 4 mm. above the base, the shorter nearly medial, long-decurrent.

Piura: Near Huancabamba, Guamani, *Weberbauer 6337* (type, *P. Briquetiana*). Above Palambla, *Weberbauer 6027* (type, *P. palamblaensis*). Ecuador.

13. MARRUBIUM L.

Coarse perennial often becoming bushy, the whitish flowers in large axillary glomerules. Stamens 4, the outer pair longer, ascending and parallel, included in the tube of the small strongly bilabiate corolla, this with erect upper lip. Calyx with 10 subequal subulate-spinulose teeth.

Marrubium vulgare L. Sp. Pl. 583. 1753. *M. hamatum* HBK. Nov. Gen. & Sp. 2: 310. 1818, fide Bentham.

Branching gray tomentose (unless leaves above) perennial, the upper branches terminating in many dense foliose bracted whorls of small white flowers; leaves rounded-ovate, crenate, rugulose.—A common weed, "horehound" to many. Illustrated, Fl. Brasilica, *pl. 6*.

Lima: Matucana, *400*.—Huánuco: Near Huánuco, *Kanehira 260*.—Junín: Near Tarma, *Stork 10945; Constance & Tovar 2398*.—Cuzco: Estac. Exp. Kaisa, *Vargas 670*. Europe to North and South America.

14. LAMIUM L.

Herbs with usually 2 or more whorls of flowers that are abruptly enlarged at the throat, the upper lip more or less arched from a narrow base, the spreading lower one with broad middle lobe, this spreading or deflexing. Calyx tubular-campanulate with 5 subequal subulate teeth. Stamens ascending under the upper lip. Nutlets apically truncate.

Lamium amplexicaule L. Sp. Pl. 579. 1753.

Low decumbent-ascending nearly glabrous often reddish suffused annual with rounded bluntly serrate or lobulate leaves, the upper clasping, and 1–3 compact whorls of red-purple flowers; upper corolla lip barbate, the lower nearly white, spotted or dotted, the tube slender, about a cm. long; stamens pubescent.—*L. purpureum* L. has all the subcordate leaves petioled and the ornamental *L. maculatum* L. has flowers to 2.5 cm. long, in several whorls.

Lima: Rock slides, Río Blanco, *673*.—Huancavelica: Among limestone boulders, 1 km. north of Huancavelica, *Stork & Horton 10819* (det. Standley). Introduced from Europe.

15. STACHYS L.

Reference: Epling, Repert. Sp. Nov. Beih. 105: 2–6. 1938.

Annual or perennial herbs, ordinarily lax, the internodes long, rarely ligneous at base. Upper leaves reduced, the shortly pedicellate flowers often 3 in their axils. Calyx in flower turbinate, in fruit campanulate or urceolate, the 5 teeth usually more or less spinulose. Corolla throat slightly if at all ampliate. Stamens 4, exserted from tube under the upper lip, the 2 cells widely divaricate. Nutlets obtuse.—Similar species particularly from Ecuador and Bolivia ought to be considered, of course, in relationship to the Peruvian, especially since the contrasting characters are tenuous or may be variable.

KEY TO STACHYS (after Epling)

Plants green but more or less pubescent.
- Corolla tube 2.5–3.5 mm. long, smooth within.
  - Leaves to 2 cm. long; calyx teeth subobtuse ..... *S. pusilla.*
  - Leaves 2–5 cm. long; calyx teeth acuminate-spinose. *S. Micheliana.*
- Corolla tube 3.5–5 mm. long, subannulate within ..... *S. arvensis.*
- Corolla tube 4.5–15 mm. long.
  - Corolla tube 1–1.5 cm. long, pilose annulate within. *S. lamioides.*
  - Corolla tube 4.5–8 mm. long.
    - Corolla tube 6–8 mm. long, annulate medially ..... *S. aperta.*
    - Corolla tube 4.5–7 mm. long, ex annulate or (*S. peruviana*) pubescent within.
      - Corolla tube 5–7 mm. long, longer than lower lip. *S. Herrerae.*
      - Corolla tube 4.5–5 mm. long, equaling or shorter than lower lip ..... *S. petiolosa, S. peruviana.*

Plants white lanate ..... *S. lanata.*

VEGETATIVE KEY

Plants white lanate ..... *S. lanata.*
Plants green.

Calyx lobes broad, minutely or obscurely spinulose, the calyx even in fruit at most 5 mm. long, suberect.

Leaves all or mostly to 1 (rarely –2) cm. long; stems matting even when elongating; calyx teeth subobtuse....*S. pusilla.*

Leaves all or mostly larger; stems diffuse; calyx more or less spinulose.....*S. petiolosa, S. peruviana.*

Calyx lobes at least soon acuminate-spinulose, often spreading, the fruiting calyx at least 5 mm. long or (and) clearly spinulose.

Calyx not twice longer in fruit than in flower; corolla tube somewhat, often clearly, exserted unless *S. Micheliana.*

Calyx about 4.5–6 mm. long even in fruit; corolla tube not or slightly exserted, not annulate; leaves subcordate.

Calyces usually multi-verticillate, about 4.5 mm. long in fruit.....*S. Micheliana.*

Calyces rather few in each node or axil, about 5 mm. long.

Corolla tube subincluded or subexserted, not longer than lower lip (Epling).....*S. peruviana.*

Corolla tube exserted, longer than lower lip (Epling). *S. Herrerae.*

Calyx in flower 7–8 mm. long; corolla exserted, piloseannulate; leaves cordate, at least mature.

Seeds smooth; corolla tube slightly exserted.....*S. aperta.*

Seeds verruculose; corolla tube long-exserted..*S. lamioides.*

Calyx twice longer (6–8 mm.) in fruit than in flower, lobes suberect; corolla included.....*S. arvensis.*

Stachys aperta Epl. Repert. Sp. Nov. Beih. 80: 37. 1934; 5.

Lax decumbent, sparsely hirsute, the stems many dm. long; petioles 1–3 cm. long; leaves cordate, deltoid-ovate, acute, 4–7 cm. long, crenate above the middle; spikes lax, the glomerules 2–6 cm. distant; the lower bracts subfoliate, the upper 2–4 mm. long; pedicels 1 mm. long; calyx turbinate in flower, 7 mm. long, in fruit 8–9 mm. long, glandular-hirsute, the spinose deltoid teeth 2–2.5 mm. long; corolla tube 6–8 mm. long, villous within and pilose annulate above the base; stamens at middle of tube, (1.5) 3 mm. exserted, the filaments densely villous below the middle; nutlets 2 mm. thick.—Stamens in type exserted 3 mm.; in the southern Peru specimens, only 1.5 mm.; this is the only known Peruvian species of this habit with corolla tube 6–8 mm. long, which has a well-defined annulus (Epling, 1944).

Huánuco: Near Muña, *3963*, type.—Ayacucho: Pampalca, *Killip & Smith 22253*.—Arequipa: Atiquipa, *Worth & Morrison 15661*. Chala, *Weberbauer 7191* (det. Epling, *S. lamioides*).

Stachys arvensis L. Sp. Pl. ed. 2. 814. 1763; 477; 3.

Decumbent annual, the stems 1–3 dm. long, sparsely hirsute including the calyces, these in flower 3–4 mm. long, in fruit twice as long, campanulate, the usually lanceolate teeth 2.5–3 mm. long, weakly awned; internodes elongate; petioles to 7 cm. long; leaves crenate, cordate-ovate, rounded, the lower 2–3 cm. long; flowers often in spicate verticils; corolla tube obscurely annulate, 3.5–5 mm. long; nutlets scarcely 2 mm. thick, muriculate.—Illustrated, Fl. Brasilica, *pl. 13*.

Lima: Environ, *Pennell 14286*. Old World; introduced in the New.

Stachys Herrerae Epl. Repert. Sp. Nov. Beih. 80: 18. 1934; 4.

Decumbent sparsely puberulent perennial, the branching stems sometimes 3 or 4 dm. long; petioles 1–3 cm. long; leaves crenate, ovate, 1.5–3 cm. long, lightly cordate, obtuse; flowers axillary or in elongate interrupted spikes; calyx in flower turbinate, in fruit urceolate, the spinulose deltoid teeth 1.5–2 mm. long; corolla tube not annulate, 5–7 mm. long, the upper lip 2.5 mm. high, the lower shorter than the tube, the stamens exserted from the latter scarcely 1 mm.; nutlets about 1.5 mm. thick.—Flowers resemble those of *S. petiolosa* Briq.. of Bolivia and Argentina more than those of *S. peruviana* Dombey, but more robust forms approach the former in habit and foliage (author); the author's key character may distinguish it from *S. peruviana*, typically at least of central Peru.

Cuzco: Tinta, *Cook & Gilbert 220*. Ollantaitambo, *Herrera 3407; Cook & Gilbert 506; 637*. Sacsahuamán, *Pennell 13577*, type; *Herrera*. Near Vilcanota, *Pennell 14186*. Cerro de Cusilluyoc, 3,200 meters, *Pennell 14153*. Near Cuzco, *Herrera*. Canas, *Vargas 11031* (det. Standley). Bolivia?

Stachys lanata Jacq. Ic. Rar. 1: 11, *pl. 107*. 1781–1786; 463.

Striking by the thick silvery white wool that entirely covers the erect tufted stems, thick leaves and dense but interrupted spikes of very short dull purple flowers; leaves oblong-elliptic, narrowed both ends, obscurely crenulate, rugose; calyx teeth subequal, acute, not subspinose.—The similar *S. germanica* L., perhaps introduced via

gardens, has subspinose calyx teeth. Cultivated as in Chile and perhaps naturalized.

Huancavelica: Near Cordova, among rock fences, *Metcalf 30264*. —Puno: Salcedo, *Soukup 573*. Mediterranean Europe.

Stachys lamioides Benth. Pl. Hartw. 244. 1846; 468; 6.

Perennial with ascending rather densely hispid usually branched stems, the petioles (2–5 cm. long), the crenate broadly cordate-ovate or -deltoid mostly acute leaves (3–6 cm. long), and the calyces rather hirsute, the last 7–8 mm. long in flower, the deltoid-ovate teeth 1.5–2 mm. long, the spinose tip to 1 mm. long; pedicels 2–4 mm. long; corolla red-purple, the tube 1–1.5 cm. long, pilose-annulate within; nutlets verruculose, nearly 2 mm. thick.

Peru(?): Compare *S. aperta*. To Colombia.

Stachys Micheliana Briq. ex Micheli, Mém. Soc. Phys. Genève 32, pt. 2, no. 10: 7. 1897.

Habit of *S. pusilla* but the stems often several dm. long and indument more hirsute; petioles to 3 cm. long; leaves gibbously crenate, cordate-ovate, obtuse, 2–5 cm. long; spikes 1–3 dm. long, the glomerules scarcely 1 cm. in diameter, the lower 1–3 cm. distant; calyx in flower 3.5–4 mm. long, the ovate-lanceolate acuminate spinose teeth 1.5 mm. long, spreading; corolla tube 2.5–3 mm. long, naked within; nutlets 1 mm. thick.—Type from Paraguay; northern plants seem to be identical (Epling).

San Martín: San Roque, *Williams 7150*. Zepelacio, *Klug 3443*. To Colombia; Brazil; Argentina.

Stachys peruviana Dombey ex Benth. Lab. Gen. & Sp. 551. 1834; 480; 4.

Similar to the related *S. Herrerae* Epl.; petioles to 1.5 cm. long; leaves rounded apically, 2–5 cm. long, glabrate except the veins; calyx 5–6.5 mm. long, the ovate obtuse teeth weakly awned, 1.5–2.5 mm. long; corolla tube 4.5–5.5 mm. long, smooth within, lower lip as long or longer.—Corolla tube of Metcalf specimen is scarcely annulate but hirtellous within (Epling); type from near Lima by Dombey. Probably the southern specimens are all the variant (or species?) *S. Herrerae*, which seems scarcely stabilized; it has rather rigidly awned calyx teeth but the distinction appears to be weak.

Lima: Asia, *Vargas 9308*. Prov. Chancay, *Stork & Vargas 9332* (det. Johnston). Near Lima, *Dombey*, type. Viso, *593*.—Ayacucho:

Puquio, Prov. Lucamas, *Metcalf 30334*.—Huancavelica: Ampurco, *Stork & Horton 10418*.—Apurímac: Chincheros, *Stork & Horton 10743*. Amprey, *Goodspeed Exped. 10629* (det. Standley).

Stachys petiolosa Briq. Bull. Herb. Boiss. 4: 868. 1896.

A diffuse procumbent-ascending herb resembling *S. peruviana* Dombey according to the author; corolla exserted, the tube 5 mm. long, hirtellous within, the erect lip 1.5 mm. long, the deflexed 2.5 mm. long; calyx teeth (as to type) 1.5 mm. high, the spinose tip 0.5 mm.—These characters, so inconspicuous, may be trivial, but may be constant and thus significant; in any case the species or phase is represented by the following fide Epling, Am. Journ. Bot. 12: 140. 1960, from a cultivated field at 3,400 meters.

Huánuco: Chavanillo, *Woytkowski 883*. Bolivia; Argentina.

Stachys pusilla (Wedd.) Briq. Ann. Cons. Jard. Bot. Genève 2: 120. 1898; 3. *S. elliptica* HBK. var. *pusilla* Wedd. Chlor. And. 2: 153. 1860; 472.

Branching sparsely hirsutulous-puberulent annual, the stems rarely 2 dm. long; petioles to 2 cm. long; leaves rather coarsely crenate-dentate, ovate or ovate-oblong, to 2 cm. long, rounded-truncate at base; flowers sometimes 2 or 3 in the upper axils; calyx in flower 3–3.5 mm. long, turbinate, in fruit 4 mm. long, urceolate, the ovate obtuse weakly if at all awned teeth scarcely 1 mm. long; corolla tube 3–3.5 mm. long, barely exserted, not annulate, the upper lip 1.5–2 mm. long; stamens in the throat; nutlets 1.5–2 mm. long.—*S. elliptica* HBK. of Ecuador is a perennial with rather glomerulate flowers, the corolla tube 7–9 mm. long.—Usually in disturbed terrain.

Lima: Río Blanco, *814; Killip & Smith 21706*. At 4,500 meters, *Weberbauer 5148*.—Huánuco: Chavanillo, (*Woytkowski 860; 1052*). Mito, *1716*.—Junín: Huarón, *1147*.—Huancavelica: Montaro Valley, 3,800 meters, *Stork & Horton 10853*.—Cuzco: Paucartambo, (*Woytkowski 92*). Marcapata, *Vargas 9715*. Río Salado, (*Vargas 5595*).—Puno: Near Huacane, *Shepard 66*. Chuquibambillo, *Pennell 13398*. Bolivia to Colombia.

16. LEONURUS L.

Erect herbs allied to *Stachys* but, especially, nutlets truncate. Leaves mostly incised lobate, the lower rounded, all far exceeding the dense axillary distinct verticils of red, roseate or white flowers.

Calyx 5-nerved, turbinate, truncate, the 5 subspinose teeth finally spreading. Corolla tube rarely exserted, naked or obliquely annulate, the oblong upper lip entire, the lower trifid, the middle lobe obcordate. Stamen cells usually parallel. Nutlets acutely triquetrous, truncate.

Leonurus sibiricus L. Sp. Pl. 584. 1753.

Stems slender, obtusely quadrate, often a meter tall or taller, early tomentulose; lower verticils remote, often in long racemes; calyx 6 mm. long; corolla pubescent, red, the tube straight, not annulate, 10–12 mm. long; nutlets hispidulous.—*L. cardiaca* L., perhaps introduced, has a villous ventricose corolla, annulate within. Illustrated, Fl. Brasilica, *pl. 11, pl. 12* (*L. cardiaca*).

Junín: Abandoned field, *Constance & Tovar 2280.* Asia; introduced, South America.

17. LEONOTIS R. Br.

Shrubs or tall herbs with multiflowered verticils of showy red or yellow flowers among many linear-subulate bracts. Calyx ovate-tubular, 10-nerved, curved at the oblique 10-dentate throat, the upper teeth larger. Corolla tube incompletely or not annulate, the upper lip erect, elongate, entire, the lower short, spreading, trifid, the middle lobe little larger. Stamens ascending, the filaments unappendaged. Anthers 2-celled. Nutlets obtuse.

Leonotis nepetaefolia R. Br. Prodr. 504. 1810.

Vigorous plant, with large flower-heads; leaves long-petioled, membranous, ovate, crenate, truncate or subcordate, obtuse or subacute, to several cm. long, glabrous or lightly tomentose, the reduced floral oblong-lanceolate; bracts subspinose; calyx nearly 2.5 cm. long, pilose only below throat, attenuate to base, upper teeth spinose, lower 3 rigid, reflexing, 4–6 lateral short; corolla villous, about 2.5 cm. long.

San Martín: Juanjuí, *Klug 4184.*—Loreto: Yurimaguas, *Williams 4523; 7840.* Iquitos, *Williams 1478.* La Victoria, *Williams 3130.* Africa; tropical Asia; introduced South America.

NOLANACEAE Dumort.

Reference: Ivan Johnston, Contr. Gray Herb. 112: 1–87. 1936.

Similar to Solanaceae vegetatively and in character of inflorescence including calyx and corolla but the ovary pentamerous (as in

Convolvulaceae) instead of dimerous; the solanaceous genus *Nicandra* Adans. has a 5-celled baccate fruit but as observed by Johnston, l.c. 2, these groups are all assumed to have had ancestry with a pentamerous ovary; the character therefore is not in itself a bar to direct relations with Solanaceae.

For a scholarly discussion of the probable origin of the family and the respective significance of the characters see Johnston's revision, 1–16; he also, with his customary attention to detail, records the history of the collections and their classifications, and aligns the specific entities to date according to probable relationship; apparently, however, a definitive classification and expression of relationship depends upon more materials and possibly investigations other than purely morphological, as evidenced by the obvious uncertainty of the position of the recently described entities of Ferreyra and Vargas within the framework of Johnston's proposed disposition.

NOLANA L.

Entire-leaved herbs or low shrubs or semi-lignescent, often more or less succulent, the particular character found in the deeply lobed fruit that consists of 3–many distinct or practically free nutlets, deeply or narrowly attached to the receptacle.—This group includes (see Johnston, l.c. 9 et seq.) *Periloba* Raf., *Bargemontia* Gaud., *Sorema* and *Dolia* Lindl. and many other segregates shown by him as correctly a part of one group of species; the other genus in the family is *Alona* Lindl. of Chile with rounded or merely 5-sulcate fruit, the carpels broadly joined laterally.

N. revoluta R. & P., Fl. Peruv. 2: 8, *pl. 113b*. 1799 (lapsus, *N. conferta* R. & P. l.c. 7, fide Johnston), and *N. tenella* Lindl., Trans. Hort. Soc. Lond. 7: 252. 1828, are omitted as not placed by Johnston, l.c. 81; the former he concluded either has not been recollected or is not a *Nolana;* the latter has been shown by Saunders, Journ. Genetics 29: 387–419. 1934, to be the *F 1* hybrid between *N. prostrata* female (i.e. *N. humifusa*) and *N. paradoxa* male (Chilean) and undoubtedly of garden origin.

Determinations by Johnston, including collections since the publication of his revision.

KEY TO NOLANA (after Johnston)

Nutlets 10 or more, diverse in position or in size or both (*N. platyphylla* 5–10 but uniseriate, subequal; fruit unknown, *N. coronata, N. plicata, N. Pearcei*).

Calyx at anthesis irregular, deeply cleft one side, sinus of somewhat spatulate lobes closed.

Leaves broadly lanceolate to cordate, abruptly contracted to petiole.

Leaves cordate-reniform, 2–4 cm. wide; corolla 3–4 cm. long. *N. spathulata.*

Leaves angulate or rounded at base, less than 2 cm. wide; corolla 2–3 cm. long..... *N. arenicola.*

Leaves spatulate to oblanceolate, petiole ill-defined.

Calyx lobes often spreading, herbaceous as compressed 7–18 mm. wide leaves.

Glabrous or glandular villous annual..... *N. latipes.*

Tomentose, suffrutescent..... *N. tomentella.*

Calyx lobes erect, succulent as the 2–6 mm. wide leaves. *N. pallidula.*

Calyx regular or nearly, not cleft, the 5 segments broadest at base, usually unequal (*N. insularis*, 2-lobed).

Medial leaves lacking, basal petioled, fasciculate... *N. scaposa.*

Medial leaves linear to spatulate, attenuate to poorly defined or obsolete petiole or petiolarly attenuate.

Plants tomentose or lanate.

Indument light, stellate-tomentose..... *N. Gayana.*

Indument dense, lanate..... *N. Cerrateana.*

Plants glabrous..... *N. Jaffuelii.*

Medial leaves sessile, little or not attenuate at base. *N. Ivaniana.*

Medial leaves abruptly expanded, the petiole definite.

Leaves reniform-cordate, petioles subamplexicaul.

Leaves not basally fasciculate; stem not fusiform. *N. Adansoni.*

Leaves (type) basally fasciculate; stem fusiform. *N. amplexicaulis.*

Leaves ovate-oblong, petioles not expanded basally.

Plants glandular.

Leaves small; calyx firm; pedicels to 1 cm. long. *N. insularis.*

Leaves ample; calyx thin; pedicels longer.... *N. inflata.*

Plants eglandular..... *N. Weissiana.*

Nutlets prevailingly 5, 2–5 or 5–10 (*N. platyphylla*), 5–12 (*N. Johnstonii*).

Nutlets deeply affixed, closely and flatly appressed, large.

Plants glabrous or essentially.

Corolla 1.5–2 cm. long; mature calyx with base contracted at each sinus by plait.....*N. humifusa.*

Corolla 2–3 cm. long; calyx evenly rounded beneath each sinus.....*N. coronata.*

Plants villous glandular or hirsute.

Indument glandular.

Calyx strongly plicate between broad lobes; leaves revolute, pubescent.....*N. plicata.*

Calyx not folded nor glabrate, leaves revolute. *N. Guentheri.*

Indument eglandular, hirsute.....*N. aticoana.*

Nutlets narrowly affixed, approximate but usually convex, small.

Calyx with 1–2 clefts, lobes unequal, obsolete or reduced.

Annual; calyx strongly and unequally bilobed.....*N. minor.*

Annual herb; calyx segments acute, entire.....*N. thinophila.*

Shrubby; calyx segments denticulate.....*N. polymorpha.*

Calyx not cleft but with 5 regular lobes.

Annual herbs, the stems erect or strongly ascending.

Mature calyx not distinctly reflexed; leaves somewhat congested toward apex.....*N. Pearcei.*

Mature calyx sharply reflexed; leaves more equally distributed.

Nutlets rugose, angled.

Leaves ovate, 4–10 mm. wide, abruptly contracted. *N. Weberbaueri.*

Leaves oblanceolate, 2–3 mm. wide, attenuate to base. *N. laxa.*

Nutlets smooth or practically, globose.

Leaves linear, glabrous or nearly.....*N. gracillima.*

Leaves oblanceolate, villous.....*N. platyphylla.*

Perennials, more or less ligneous, if flowering as annuals, prostrate.

Indument entirely of branched or stellate trichomes. *N. pallida.*

Indument mostly or entirely of simple trichomes or lanuginose.

Leaves and young twigs stiped-glandular.

Nutlets 5–8; corolla longer than 2 cm...*N. lycioides.*

Nutlets 5–12; corolla 12–15 mm. long...*N. Johnstonii.*

Leaves and young twigs with curved or flexuose obscurely or not glandular trichomes (cf. *N. pilosa*), usually more or less tomentose.

Slender-stemmed; corolla 10–13 mm. across; tomentum often rather arachnoid or obscure.

Leaves fasciculate, linear or nearly.

Flowers pedicellate.....*N. confinis.*

Flowers sessile.....*N. spergularioides.*

Leaves solitary, elliptic-oblanceolate.*N. urubambae.*

Coarse stems (to 3 mm. thick); corolla 13–23 mm. across.

Indument a somewhat glandular pilosity, not arachnoid; calyx cupulate.....*N. pilosa.*

Indument an eglandular lanosity; calyx fusiform. *N. Tovariana.*

NOLANA, HERBACEOUS (that is, artificial) KEY

Calyx at anthesis more or less 1–2-cleft, lobes somewhat unequal, apically dilated or reduced (equally more than medially 2-lobed, *N. insularis*).

Leaves angulate-rounded to subcordate; calyx lobes dilated at apex.

Corolla 3–4 cm. long; leaves partly subcordate, 2–4 cm. wide. *N. spathulata.*

Corolla 2–3 cm. long; leaves angulate or rounded at base, narrower than 2 cm.....*N. arenicola.*

Leaves somewhat attenuate to base, often narrow; calyx lobes not dilated, sometimes broad or obsolete.

Herbaceous, at least the branches (or *N. thinophila*, only branchlets).

Calyx about 1.5 cm. long, with 5 unequal lobes.

Leaves 7–18 mm. wide; calyx lobes spreading..*N. latipes.*

Leaves 2–6 mm. wide; calyx lobes erect.....*N. pallidula.*

Calyx 6–8 mm. long, lobes obsolete.....*N. thinophila.*
Calyx lobes 5–6 mm. long, lobes unequal.....*N. minor.*
Lignescent, even the branchlets, or only at base; calyx 2-lobed.
Indument eglandular.
Calyx bilabiate; lobes entire or in part entire.
Nutlets 10 or 11; plants tomentose.....*N. tomentella.*
Nutlets 4; plants hirsute.....*N. aticoana.*
Calyx equally bifid; lobes apically denticulate.
N. polymorpha.
Indument glandular.
Calyx unequally lobed subbasally or more than medially.
N. lycioides.
Calyx equally bilobed more than medially....*N. insularis.*
Calyx at anthesis regular or nearly, not 1–2-cleft even about medially, the lobes equal or unequal.
Calyx lobes in part oblong-spatulate, in part lance-acuminate.
N. scaposa.
Calyx lobes sublinear, usually longer than tube.
Leaves linear or subfiliform.
Flowers pedicellate.
Plants glabrous or nearly.....*N. gracillima.*
Plants tomentose or rarely glabrate.....*N. confinis.*
Flowers sessile.....*N. spergularioides.*
Leaves lanceolate-ovate.
Eglandular villous annual.....*N. platyphylla.*
Glandular, suffrutescent.....*N. Johnstonii.*
Calyx lobes broader than sublinear, rarely longer than tube.
Calyx rarely 8 mm. long (9–14 mm., *N. Cerrateana*), lobes rather narrow but not sublinear.
Shrub; indument stellate; leaves 2–4 mm. wide...*N. pallida.*
Shrub; branchlets subhispidulous; leaves to 1 mm. wide.
N. lycioides.
Annual or suffrutescent but trichomes mostly or all simple.
Pedicels at anthesis only 1 mm. long, villous..*N. Pearcei.*
Pedicels at anthesis longer than 1 mm., soon much longer.
Leaves ovate, abruptly petioled.....*N. Weberbaueri.*
Leaves oblanceolate, attenuate to base.

Pedicels reflexed (in fruit); annual (type) . . . . . *N. laxa.*

Pedicels recurving or ascending; types suffrutescent.

Calyx 6–8 mm. long (anthesis).

Pedicels to 4 mm. long; corolla as calyx 6 mm. long . . . . . *N. urubambae.*

Pedicels to 1.5 cm. long; corolla 12–22 mm. long.

Laxly prostrate; nutlets 4–8 . . . . . *N. pilosa.*

Ascending-erect; nutlets 5–12 . . . . *N. Johnstonii.*

Calyx 9–14 mm. long; nutlets 10–14 . . *N. Cerrateana.*

Calyx usually soon 1 cm. long (unless *N. Gayana*), lobes ovate, tips often narrow or lobes narrow but calyx fusiform (*N. Tovariana*).

Plants glabrous or essentially.

Stem leaves reniform-cordate, not decurrent . . *N. Adansoni.*

Stem leaves decurrent but petioles defined.

Corolla at most 2 cm. long; mature calyx alate basally at each sinus . . . . . *N. humifusa.*

Corolla 2–3 cm. long; calyx little or tardily alate. *N. coronata.*

Stem leaves apparently sessile, petioles not defined. *N. Jaffuelii.*

Plants more or less pubescent, villous glandular or lanate.

Medial leaves not or little narrowed at base, sessile. *N. Ivaniana.*

Medial leaves attenuate to often poorly defined petiole (compare *N. inflata*).

Calyx strongly plicate; leaves lanceolate-ovate . *N. plicata.*

Calyx not folded; leaves oblong-elliptic or sublinear.

Calyx not fusiform; pedicels recurving unless *C. Cerrateana.*

Leaves elliptic-obovate, rounded at apex. *N. Guentheri.*

Leaves suboblong, subacute.

Indument lightly tomentulose . . . . . *N. Gayana.*

Indument a dense lanosity . . . . . *N. Cerrateana.*

Calyx fusiform; pedicels ascending . . . . . *N. Tovariana.*

Medial leaves abruptly expanded, the petioles thus well-defined.

Leaves reniform-cordate; petioles subamplexicaul. *N. amplexicaulis, N. Adansoni.*

Leaves ovate-oblong; petioles not expanded at base.

Leaves puberulent; calyx thin; pedicels to 5 cm. long. *N. inflata.*

Leaves villosulous; calyx firm; pedicels to 1 cm. long. *N. insularis.*

Leaves lanuginose; pedicels 2–7 mm. long. *N. Weissiana.*

Nolana Adansoni (Roem. & Schult.) Johnst. Contr. Gray Herb. 112. 47. 1936. *Tula Adansoni* Roem. & Schult. Syst. 4: 355. 1819. *Sorema cordata* Remy, Ann. Sci. Nat. sèr. 3, 6: 351. 1846. *N. cordata* (Remy) Dunal in DC. Prodr. 13, pt. 1: 13. 1852.

Flexuose-stemmed shrub or apparently flowering as an erect annual, glabrous except for obscure papillosity; petioles about 5–7 mm. long, often clearly amplexicaul; leaves evenose, plane, reniform-cordate or subcordate, rounded at apex, mostly 8–9 mm. wide, not quite as long; pedicels ascending or in fruit curved-spreading, 2–3 mm. long; calyx campanulate, 5 mm. long, in fruit about 7 mm. long, the subequal ovate-oblong lobes very obtuse, sparsely ciliate, nearly as long as the plane rounded tube; corolla blue, about 1.5 cm. long, not much expanded apically; filaments somewhat unequal.—Fruit consists of 15–20 subspherical nutlets in 2–3 series on cartilaginous gynobase occupying half of the receptacle, the 2–5 uppermost nutlets 1.5–2 mm. in diameter, the remainder usually 1 mm. thick or smaller (Johnston). Guenther and Buchtien found a white-flowered plant. To Worth and Morrison the plant felt wet, and Eyerdam noted a sticky varnish-like fluid on stems and branches. Illustrated, Feuillée, Journ. Obs. Phys. (Hist. Pl. Medicinal) 3: 63, *pl. 44;* Weberbauer, 137, *fig. 7a.* F.M. Neg. 23239 (type, *S. cordata*).

Arequipa: Chala and Atico, *Raimondi 11779.* Lower edge of lomas, Mollendo, *Weberbauer 1481; (Hill 342; Stafford 29).* Islay, *d'Orbigny* (type, *N. cordata*). Prov. Islay, *Worth & Morrison 15725; Eyerdam 25156; Mexia 7773; 04182.* Among rocks, *Mejia,* (*Guenther & Buchtien 109; 111*); *Ferreyra 6387* (det. Johnston).—Moquegua: Ilo, (*Feuillée,* type).—Tacna(?): (*Pearce*).

Nolana amplexicaulis Ferr. Publ. Hist. Nat. "Javier Prado" Bot. ser. B, no. 10: 7, *pl. 4.* 1955.

Erect glabrescent annual sometimes 1.5 dm. high, shortly branched, the glabrous stems fusiform, 1–4 mm. thick, with a fascicle of 6–9 basal leaves; petioles 5–14 mm. long, conspicuously amplexicaul, the leaves reniform, 5–8 mm. long, 8–13 mm. wide, rounded-obtuse, concave at base; pedicels 2.5–4 mm. long, sparsely glandular as the calyces without, these pubescent within with rigid trichomes, 5–5.8 mm. long, 3.5–4 mm. across, the tube 3–3.2 mm. long, the lobes ascending, obtuse, 2 larger 2.8–3 mm. long, 1.5–2 mm. wide, three 1–1.2 mm. long, 1.2–1.8 mm. wide; corolla subcylindric, blue, 10.5–13.5 mm. long, 5–6 mm. across, the 5 lobes triangular obtuse, glabrous, the tube pilose without, villous within; filaments 8–10.5 mm. long, unequal; style 7–8 mm. long; nutlets 20 or 21, biseriate, black, the larger globose, 1.5–1.6 mm. thick, the smaller pyriform, 0.6–1 mm. in diameter but submature; receptacle excavated, cupuliform.—The species proposed is separable from *N. Adansoni* (Roem. & Schult.) Johnst. by its herbaceous fragile habit, fusiform nearly simple stem, basally fasciculate leaves, unequal calyx lobes, subcylindric corolla with triangular lobes (author); the characters seem tenuous.

Arequipa: Lomas de Capac, near Chala, *Ferreyra 11747* (type, Herbarium San Marcos, 15721).

Nolana arenicola Johnst. Contr. Gray Herb. 112: 29. 1936.

Glandular puberulent annual to 4.5 dm. high, 3–5 dm. across, the laxly branched decumbent fistulose stems 2–4 mm. thick, the internodes 1–5 cm. long; leaves ovate or broadly lanceolate, 1–3 cm. long, abruptly contracted at obliquely rounded obtuse or acute base into petiole about 1 (–2) cm. long, compressed, plane or narrowly revolute, subcostate, succulent; pedicels slender, 0.5–2 cm. long, more rigid and decurving in age; corolla blue, 2–2.5 (–3) cm. long, the tube 5 mm. long, densely villosulous within; calyx in flower 1–1.5 cm. long, 3–4 (–5) mm. across, 1–2-cleft, the 5 unequal lobes spathulate, erect, in fruit conspicuously distended and about 8 mm. thick; fruit with 5 larger, 5–10 smaller nutlets, all angled, rugulose, 2–7 mm. long, gynobase excavated, 3 mm. high and thick.—An interior species obviously related to the coastal *N. spathulata* R. & P. but smaller in all parts and the leaves rounded or angulate at base; mature epicarp is a fragile loose glossy shell that falls away exposing the dull rough endocarp, probably similar to that of *N. spathulata*, unknown in maturity (author).

Tacna: Near Tacna, 650 meters, *Werdermann 730*, type; *723; 728; Woitschach 98; 99;* (*Pearce, Ortiga*). Cachendo, 1,000 meters, (*Guen-*

ther & Buchtien 110; 123, all det. *N. prostrata* L., i.e. *N. humifusa*, by Bruns).

Nolana aticoana Ferr. Publ. Hist. Nat. "Javier Prado" Bot. ser. B, no. 10: 13, *pl. 9*. 1955.

Suffruticose, erect, hirsute, the ascending branches 4–6 mm. thick; leaves lanceolate, sessile, gradually attenuate to base, acuminate, 2–3.7 cm. long, 5–11 mm. wide, obscurely pinnate-nerved; pedicels ascending, 7–15 mm. long; calyx bilabiate, 15–17 mm. long, 5–7 mm. across, lightly hirsute, the tube 7 or 8 mm. long, the subtriangular ascending lobes acute, 8 or 9 mm. long, about 4 mm. wide at base; corolla infundibuliform, blue, 3 cm. long, nearly as broad above, very obscurely and obtusely lobulate, eciliate, the short tube densely puberulent glandular within, pubescent without; filaments unequal, the 2 larger about 1.5 cm. long, adnate to tube a third of the length, the 3 smaller 12 mm. long; style 14–16 mm. long, nutlets 4, uniseriate, more or less reniform, lightly rugose and depressed, 5.5–8 mm. long, 4–7.8 mm. thick.—Resembles *N. Guentheri* Johnst. of the Pampa de la Jolla at 1,000 meters but separated by its hirsute pubescence, sessile lanceolate acuminate leaves, and 4 nutlets, the larger to 8 mm. long (author).

Arequipa: Lomas de Atico, Chala to Camana, *Ferreyra 2524*, type.

Nolana Cerrateana Ferr. Publ. Hist. Nat. "Javier Prado" Bot. ser. B, no. 10: 11, *pl. 8*. 1955.

More or less pubescent, suffruticose, decumbent, the stems 2.5–3.5 mm. thick, the branches 6.5–14 cm. long, 1–3 mm. thick, lanate, flexuose; leaves fasciculate, linear-lanceolate, long and narrowly attenuate to base, acute, slightly revolute, 11–26 mm. long, 2–5.5 mm. wide; pedicels 0.5–3.5 cm. long, ascending; calyx campanulate, lanate-pubescent, 9–14 mm. long, 3–5 mm. across, the tube 3–7 mm. long, the acuminate suberect lobes 4–7 mm. long, 1.8–3.5 mm. wide at base; corolla infundibuliform, blue, 17–23 mm. long, 12–20 mm. broad above, obscurely lobulate, marked by notch-like indentations, the short tube pilose within; filaments slightly unequal, the larger 11–14 mm., the smaller 1–11 mm. long; style 7–8.5 mm. long; nutlets 10–14, biseriate, reniform, muricate, the 5 inner 4–4.8 mm. long, 3–3.5 mm. thick, the 5–9 outer 2.8–3 mm. long, about 2 mm. thick. —Differs from *N. pilosa* Johnst. at first sight by its long pedicels, larger calyx and numerous biseriate nutlets; the Worth and Morrison collection has some leaves to 4 cm. long, 7 mm. wide, but on young

flowering branchlets. Dedicated to my colleague and friend, Emma Cerrate, enthusiastic collaborator of the Department of Botany, of the Museum of Natural History, Lima (author).

Arequipa: Lomas de Camaná, *Ferreyra 2558* (type, Herbarium San Marcos *15725*); *Ferreyra 6439; 8826; 8837; Vargas 2000.* Fourteen km. south of Chala, *Worth & Morrison 15694.*

Nolana confinis Johnst. Contr. Gray Herb. 112: 78. 1936. *Bargemontia confinis* Johnst. l.c. 85: 176. 1929.

Type a laxly decumbent much branched sparsely arachnoid-lanose eglandular shrub but flowering as an annual herb; young branches of type ascending, to 1.5 dm. long, 1.5 mm. thick; internodes to 1.5 cm. long, the branchlets mostly in axils of fasciculate leaves, these compressed, linear or linear-spatulate, obtuse, 3–10 (–20) mm. long, 1 (–2) mm. wide; flowers solitary in axils of leafy branchlets, the slender pedicels 9–18 mm. long, in fruit recurved; calyx in anthesis 4–5 mm. long, the cupulate tube about 2 mm. thick, the erect lanceolate unequal lobes 2–3 mm. long, the fruiting calyx about 4 mm. across; corolla violet, 15–17 mm. long, glabrate without, glabrous (as unequal filaments) within, the tube 3–4 mm. long; fruit 5 more or less tuberculate angled black nutlets about 2 mm. thick, on a low but distinctly pyramidal gynobase which occupies much of receptacle.—Type undoubtedly perennial but probably, from other quite herbaceous specimens, flowering as an annual; leaves fasciculate usually in a flock of woolly hairs but in doubtful Woitschach collection indument is merely minute curved hairs, leaves several mm. broad, not fasciculate (author).

Moquegua: Near Tacna, 800 meters, *Woitschach; Werdermann 720; Pearce.* Candarave, 4,000 meters, *Weberbauer 7382*, type. Altos de Sitana near Valle de Locumba, 1,500 meters, *Woitschach?*

Nolana coronata R. & P. Fl. Peruv. 2: 7, *pl. 112b.* 1799; 55.

Sprawling glabrous (or ex original char. villosulous) perennial (probably flowering first year), the older somewhat ligneous stems about 5 mm. thick; internodes of the flowering branchlets 2.5–4 cm. long; petioles margined, slightly enlarged at base, the midrib often 2–3 cm. long; leaves more or less obliquely ovate or sometimes subrotund, the rounded-subcordate base shortly attenuate into the petiole, the apex acute or subacute, mostly 3–4 cm. long, 2.5–3 cm. wide; pedicels solitary, spreading to suberect, about 2–3.5 cm. long, apparently curved in age; calyx in flower nearly 2 cm. long, shortly and

obscurely plaited below each sinus of the triangular-acuminate subequal lobes, these about as long as the broadly campanulate tube; corolla finally 3 cm. long, not much ampliate, glabrous or with a few trichomes toward base; stamens unequal, to 1 cm. long.—Type shows a short-lived tap root, base perhaps somewhat woody and persisting, stems not pubescent as illustrated nor calyx so patently ribbed; fruit unknown except from plate, but seems to be the closest relative of *N. humifusa* (Johnston). F.M. Neg. 23240.

Arequipa: Pongo and Atiquipa, *Tafalla*, (*Ruiz & Pavón*, type); *Raimondi 10857*.

Nolana Gayana (Gaud.) Koch, Ind. Sem. Berol. 1855: appendix 12. 1855(?); 33. *Alibrexia Gayana* Gaud. Bot. Voy. Bonite, Atlas *pl. 105*. 1851–52.

Prostrate perennial (flowering as annual), the more or less ligneous older stems 5 mm. thick, straw-colored, lustrous, glabrous, rooting at the nodes, the leafy flowering branches and leaves, especially early, somewhat canescent with short branched or stellate trichomes; leaves linear to spatulate, or oblong-elliptic, long-attenuate to scarcely petiolar base, subacute, 1–4 cm. long, 1.5–10 mm. wide, evenose, somewhat revolute; pedicels 5–15 mm. long, recurving in fruit; calyx lobes subequal, ovate-acuminate, the narrow tip often recurved, about as long as tube or 5 mm. long; corolla lavender-blue, lightly puberulent, 1.5–2 cm. long or somewhat larger.—Fruit consists of 5 sharply angulate major nutlets and several minor ones wedged between the bases of the major; I am judging the species entirely from the excellent plate, the unknown type probably from Lurín by Gay (Johnston); my specimens were prostrate in the dryer scarred slopes of sandy hills, the flowers lavender-blue. This may be the species recorded by Ruiz and Pavón under the native name "chaves."

Ancash: Lomas de Mongón, *Goodspeed Exped. 9187*.—Lima: Lower edge of lomas, Barranca, *Weberbauer 1606*. Tablada de San Juan, *Martinet 287*. Tablada de Lurín, *Mathews 836; 837*. Lurín, *5937; 5991*.

Nolana gracillima Johnst. Contr. Gray Herb. 112: 59. 1936. *Bargemontia gracillima* Johnst. l.c. 85: 176. 1929.

Similar to *N. platyphylla* Johnst. but, as to type at least, much branched, sparsely and obscurely villosulous, leaves very slender, corolla about twice as long as calyx; leaves linear or narrowly spatulate-linear, 1–2.5 cm. long, about 1–1.5 mm. wide, obtuse, attenuate

to base; calyx in anthesis 4–6 mm. long, the lobes subulate; corolla violet, 10–12 mm. long, the tube villous within.—Fruit consists of 5 subequal globose nutlets 1.5–2 mm. long, affixed to a flattened receptacle; on the sheet of the type number in Gray Herbarium there is one plant that I believe is a hybrid since it combines a number of the quite diverse traits of this and *N. platyphylla* Johnst. (author).

Moquegua: Southeast of Moquegua, 1,500 meters, *Weberbauer 7457*, type.—Tacna: Near Tacna, (*Pearce*).—Arica: Putaralla, *Troll 3300*. Chile.

Nolana Guentheri Johnst. Contr. Gray Herb. 112: 55. 1936.

Laxly decumbent herb, the many sparsely branched stems 2–5 dm. long, 3–5 mm. thick, densely glanduliferous, more or less villous, soon glabrescent; internodes 3–7 cm. long; leaves elliptic or obovate, 2–3 cm. long, 1.5–2.5 mm. wide, rounded at apex, more or less attenuate below the middle into a petiole 1–1.5 cm. long, 1.5–2 mm. wide, medially costate but obscurely nerved, somewhat villous marginally; calyx at anthesis 10–13 mm. long, stipitate, glandular villous, the tube 3–4 mm. long, the cuneate-lanceolate acute lobes erect, 1.5–2 mm. long, incurved in fruit; pedicels 1–5 mm. long, in fruit recurved, 5–25 mm. long; corolla 2.5–3 cm. long and broad; nutlets 5, uniseriate, angled, about 4 mm. long, dorsally convex, cicatrorse on inner surface; receptacle about 6 mm. thick, with 5 deep excavations.—Resembles *N. humifusa* (Gouan) Johnst. in gross habit but slightly coarser with evidently pubescent herbage and a very different calyx (author).

Arequipa: Cachendo, 1,000 meters, (*Guenther & Buchtien 113*, type).

Nolana humifusa (Gouan) Johnst. Contr. Gray Herb. 112: 50. 1936. *Atropa humifusa* Gouan, Hort. Reg. Monspel. 106. March–June, 1762. *N. prostrata* L. f. Decas Pl. Rar. Upsal. 1: 3, *pl. 2*. July–Sept., 1762.

Repent or half-decumbent glabrous (or essentially) perennial but the slender stems from a finally stout caudex scarcely ligneous, often several dm. long; leaves obliquely ovate to subrotund, subobtuse, at base rounded or attenuate from about the middle into petiole 1 cm. long or shorter, the medial often 2–3 cm. long, about half as wide, sometimes with a few trichomes at the base; pedicels in flower slender, to 1.5 cm. long, in fruit stouter, recurved, sometimes 2 cm. long; calyx broadly campanulate, 1 cm. long, angled by the extension of

obvious plaits below each sinus, the lobes (about 5 mm. long) ovate-acuminate; corolla 1.5 cm. long, or somewhat longer; nutlets 5, minutely lacunose, angulate, about 5 mm. long.—Grows in rocky or sandy clay terrain and several collectors have noted violet lines or color in the throat of the blue flowers. Johnston, l.c., gives a complete painstakingly worked out synonymy and an interesting explanation of dates and name origins, l.c. 51–54; he shows that the plant was recorded as Peruvian only by Linnaeus in his Mantissa, 1771, that the original seeds were probably collected by Joseph de Jussieu, and that the original diagrams were drawn from garden material. The native name "chaves" noted by Ruiz and Pavón probably refers to this species or to *N. Gayana* (Gaud.) Koch. Illustrated, Saunders, Journ. Genetics 29, *pl. 33, figs. 7–12;* Schmidel, Icon. Pl. 67, *pl. 18* (as *Teganium procumbens*).

Lima: Callao, *5885.* Lomas de Chancay, *Raimondi 10910.* Amancaës, *Pennell 14808.* Cerro San Cristobal, *Brenning 155.* Cerro San Augustin, *Weberbauer 1; Raimondi.* San Lorenzo Island, *Gaudichaud.* Barranco, *Weberbauer 1603; 5701.* Chorillos, *5858; Raimondi.* Cerro Geronimo, *Soukup 3139; Ochoa 570.* Prov. Chancay, *Goodspeed Exped. 9113; 9158; 9236; 9259.* In rocks, Compoy, *Mexia 04027.*

Nolana inflata R. & P. Fl. Peruv. 2: 7, *pl. 112a.* 1799; 49. *Cacabus? inflatus* (R. & P.) Miers, Ann. & Mag. Nat. Hist. ser. 2, 4: 255. 1849. *N. ventricosa* R. & P. l.c.

Root strong, probably persistent, extending into thick stem-base, this 2.5–5 cm. long, about 1 cm. thick, covered with corky stem- and leaf-bases; stems several, ascending or decumbent, the many leaves rarely opposite, the lowest with margined petioles to 3 cm. long, the blades oblong- to ovate-elliptic or rather so, undulate or obscurely 1–2-cupulate or sometimes coarsely irregularly serrate, more or less puberulent as the calyces; stem leaves obliquely subovate-rounded, sometimes oblong-elliptic, often about 2–2.5 cm. long, 1.5–2 cm. wide; petioles poorly defined; calyx campanulate in flower, about 10–12 mm. long, subglobose but little enlarged in fruit, the ovate lobes acuminate or acute, obscurely nerved; pedicels finally more or less arcuate, to 2 cm. long, often much shorter; corolla about 2 cm. long, pinkish-lilac to purple (Worth); receptacle flattened and marked off by low radiating ridges into five sections, each bearing a broadly and basally affixed rounded nutlet; wedged between the contiguous bases of these major nutlets and attached in tiny areolas at the outer end

of the ridges are 5–8 angular nutlets only 1–2 mm. long, about 1 mm. high; some nutlets have several dorsal subulate appendages nearly 0.5 mm. long or homologous scattered conic projections (Johnston). —The Tafalla specimen at Madrid had flowers about 5 cm. long on purplish pedicels to 2.5 cm. long. Description as to fruit from Tafalla's plate and also in part after Johnston's corrections of the plate; it is not probable that the Martinet locality is the one at which he collected his number *288*. F.M. Neg. 23242.

Arequipa: Pongo and Atiquipa, *Ruiz & Pavón*. Hills near Camaná, *Tafalla*, type. Camino del Inca at Lurigancha, *Martinet 288*. North of Atiquipa, *Worth & Morrison 15637*.

Nolana insularis Johnst. Contr. Gray Herb. 112: 49. 1936. *Periloba insularis* Johnst. l.c. 95: 32. 1931.

Low, spreading, with a coarse widely branched woody caudex (to 12 mm. thick), the stems roughened with persisting corky petiole-bases, the branches (often 1.5–3 cm. thick), leaves and corollas villosulous with slender forked or denticulate trichomes or in part simple, more or less minutely glanduliferous; leaves ovate or obovate, rounded at tip, attenuate to petiole 5–10 mm. long, the blade 1–1.5 cm. long, 6–8 mm. wide, the caudex leaves rosulate, the cauline 1–15 mm. distant, the upper little reduced; pedicels slender, about 1 cm. long, deflexed in age, equaled by the obconic calyx, this in fruit about 8 mm. across, 6–7 mm. high, cleft more than medially into 2 acute incurved lobes; corolla blue, infundibuliform, 2 cm. long, the tube 5 mm. long, the gradually ampliate throat 1 cm. long, to 1 cm. across; filaments 3 and 4 mm. long, about 5 mm. above base, villous only below, elliptic anthers 1.8 mm. long, glabrous style 1 cm. long; gynobase lacunose, 2–2.5 mm. broad, the many unequal nutlets 1–2.5 mm. long, subangulate, black, subopaque, delicately alveolate.— The gross habit suggests *N. humifusa;* all the congeners are Chilean (author, 33). The receptacle is occupied by a rounded gynobase bearing about 15 nutlets in 2–3 series, those near the apex, about 5, being the largest (Johnston, 49); plate 6 of the author's original publication reproduces two photographs of the island by the distinguished ornithologist, Robert Cushman Murphy; see also *Solanum Murphyi* Johnst.

Ica: Fog-bathed crests of St. Gallen Island, (*Murphy 3472*, type).

Nolana Ivaniana Ferr. Publ. Hist. Nat. "Javier Prado" Bot. ser. B, no. 10: 3, *pl. 1*. 1955.

Conspicuously hirsute annual herb, the stems ascending, the lax branches 1.2–2.5 mm. thick; leaves sessile, lanceolate or elliptic-lanceolate, usually obtuse both ends or rarely more or less acute, 13–30 mm. long, 4–13 mm. wide; pedicels at anthesis 11–18 mm. long, ascending; calyx 13 or 14 mm. long, 3.5–4.5 mm. across, campanulate, the 5 lobes nearly linear, 7–7.5 mm. long, 2–2.5 mm. wide at base, ascending, acuminate, dorsally hirsute; corolla infundibuliform, blue, 15–24 mm. long, 12–16 mm. in diameter, inconspicuously lobulate, the tube lightly villous within; filaments villous, unequal, one inserted slightly below the middle of the tube, the 2 larger 14 or 15 mm. long, the 3 smaller about 13 mm. long; style about 1 cm. long; nutlets 15 or 16 in three series, reniform, the larger 5–6 mm. long, 3.6–4 mm. wide, the 10 or 11 smaller ones 2–3 mm. long, 1–1.5 mm. thick.—Closely allied to *N. latipes* Johnst. but differing in its conspicuously hirsute indument, its sessile lanceolate narrow-based leaves, the smaller calyx (to 14 mm. long), the longer stamens (to 1.5 cm. long), and the larger not angled reniform nutlets (to 6 mm. long); it is less related to *N. platyphylla* Johnst. of western Moquegua but is distinguished by its sessile leaves, obtuse both ends, the larger (to 24 mm. long) corolla and the reniform larger nutlets. Named for the author's teacher and friend, the brilliant Professor Ivan M. Johnston of Harvard University.

Arequipa: Lomas Mollendo to Matarani, *Ferreyra 11564* (type, Herb. San Marcos, *15718*); *Vargas 8470*.

Nolana Jaffuelii Johnst. Contr. Gray Herb. 112: 39. 1936.

A glabrous annual herb with many decumbent simple or sparsely branched stems 1–3 dm. long, 2–3 mm. thick, and minutely vesiculose leaves; basal leaves scarcely persisting, oblanceolate, obtuse, 3–6 cm. long, 8–15 mm. wide, attenuate below the middle into petiole 2–4 mm. long, the medial and upper obliquely and broadly sessile, conspicuously decurrent, not at all auriculate, oblong-lanceolate or ovate, 6–12 mm. long, 2–4 mm. wide; pedicels 1–3 cm. long, more rigid and ascending in fruit; calyx 8–10 mm. long, angled, the tube 5–6 mm. thick, twice as large in fruit, plicate about 3 mm. below the sinus, the triangular lobes acuminate; corolla blue, 13–20 mm. long, often twice as long as the calyx; filaments unequal; nutlets about 3-seriate, 1–3 mm. thick, pale, angulate, lacunose.—Named for a collector who obtained several specimens at the type locality, Tocopilla, Chile.

Tacna: Hills near Tacna, (*Pearce*). Chile.

Nolana Johnstonii Vargas, Revista Univ. Cuzco 43, no. 107: 155, *pl. 5*. 1955.

Root napiform, rather stout, 6–8 mm. across; stems 3–4 dm. high, suffrutescent, branched, glandular-pilose; internodes about 1.5–2 cm. long; leaves oval-spatulate, contracted at base into petiole 1–4 mm. long, gradually more attenuate toward the apex, the lower (including petiole) to 22 mm. long, 12 mm. wide, pilose glandular toward the margins; flowers many, the pedicels closely pilose, 2–10 mm. long; calyx tubular, sparsely pilose-glandular, the tube 2–3 mm. long, the linear-acuminate lobes 3 mm. long; corolla white or blue as the unequal filaments, infundibuliform, 12–15 mm. long; style little longer than stamen; fruit consisting of 5–12 globose nutlets.—Perhaps related to *N. gracillima* Johnst. of the interior of Moquegua but the habit is different, also the form of the leaves and the number of nutlets (author).

Moquegua: Lomas de Mostacilla, 50–300 meters, *Vargas*, type.

Nolana latipes Johnst. Contr. Gray Herb. 112: 30. 1936.

Depressed glabrous or slightly glandular villous annual, the fistulose laxly branched ascending or decumbent stems 1–3 dm. long, 2–4 mm. thick; leaves oblanceolate or obovate-oblong, obtuse, attenuate to base (scarcely petiolate), 2–4 cm. long, 7–18 mm. wide, compressed, plane, minutely papillate; pedicels 1–2 cm. long, in fruit 1.5–2.5 cm. long, more or less recurved or deflexed; calyx in flower 1.5 cm. long, 4–5 mm. across, deeply bifid, the 5 unequal lobes 2–5 mm. long, but calyx in fruit conspicuously divergent-biparted; corolla blue or lavender, 1.5–2 cm. long, 2 cm. across, the tube 3–4 mm. long, villous within including unequal filaments at base; fruit about 8 mm. thick; nutlets 10–20, black, strongly irregularly rugose, angled, the larger ordinarily 5, about 4 mm. long, cicatrose on inner face; receptacle about 10-dentate, gynobase 2–3 mm. thick and high, prominently 5-excavate.

Arequipa: Lower edge of lomas, Mollendo, *Weberbauer 1498*, type; *Stafford K56*. Mejía, (*Guenther & Buchtien 114*). Cachendo, (*Guenther & Buchtein 1568*). Near Islay, *Worth & Morrison 15709; 15736; Mexia 04184*.

Nolana laxa (Miers) Johnst. Contr. Gray Herb. 112: 59. 1936. *Dolia laxa* Miers in Hooker Lond. Journ. Bot. 4: 504. 1845.

Described by Miers as a little shrub, tomentose, and the branchlets lax, slender; leaves few, geminate, linear-spatulate, acute, 18 mm.

long, scarcely 2 mm. wide, fleshy; peduncles solitary in the axils, 2 mm. long; calyx lobes linear, acute, 2 mm. long; corolla tube slender, ampliate above.—So evident is the relation with *N. Weberbaueri* Johnst. that "I should not be surprised if intergrades are discovered" (Johnston); nor I, if only one genetic entity is concerned.

Lima: Canta, *Ruiz & Pavón*, type (Kew).

Nolana lycioides Johnst. Contr. Gray Herb. 112: 70. 1936.

Laxly but rigidly branched shrub about 1 meter tall, even the slender divaricate branches lignescent; branchlets foliose, densely stipitate glandulose, obscurely hispidulous, 2–6 cm. long; internodes 1–5 mm. long; leaves spatulate, rounded at apex, plane or nearly, 5–9 mm. long, 0.5–0.9 mm. wide, densely glandular, often subfasciculate; pedicels 3–8 mm. long, slender, little accrescent in fruit, apparently ascending; calyx closely glandular, at anthesis 4 mm. long, in fruit 6–7 mm. long, cleft nearly (or more than half) to base into unequal cuneate lobes 2–3 mm. long; corolla blue, 2.2–2.7 cm. long, sparsely glandular and puberulent, within minutely puberulent, the tube 8–10 mm. long, less than 1 mm. thick, the throat abruptly ampliate, (6) 10–12 mm. across, the limb in type 18–20 mm. across, rounded lobes ascending, sinus closed; filaments unequal, linear, glabrous, affixed at apex of tube; nutlets 5–8, uniseriate, mature unknown. —Distinctive by its large corollas with elongate very slender tube, broad throat and limb, and slender subrigid ligneous twigs (author).

Arequipa: Gravelly places in the lomas near Mollendo, (*Weberbauer 1517*, type, Herb. Berlin–Dahlem). Ten km. south of Mollendo, *Eyerdam 25174*.

Nolana minor Ferr. Publ. Hist. Nat. "Javier Prado" Bot. ser. B, no. 10: 4, *pl. 2*. 1955.

A small annual 2–5 cm. high from a simple filiform root, the very slender glabrous stem rarely with a few branches; leaves sessile, linear or spatulate, gradually attenuate to base, the apex obtuse, 8–14 mm. long, 1–4 mm. wide, inconspicuously glandular, the lower amplexicaul, 1-nerved; pedicels 3–4 mm. long, glabrescent; calyx at anthesis 5.5–6 mm. long, 1.5–2 mm. thick, deeply bifid, unequally bilobed, the lobes 2.3–2.5 mm. long, 1.8–2.8 mm. wide, obtuse; corolla infundibuliform, deep blue, 9.6–11.8 mm. long, 6.5–7.5 mm. in diameter, the 5 unequal lobes obtuse, the tube villous within; filaments 6.5–10.5 mm. long, linear, compressed, sparsely villous toward base; style 7.5–8.2 mm. long; nutlets 2, rarely an obscure third, more or less

pyriform, minutely muricate, 2.6–3 mm. long, 2–2.2 mm. thick, the interior surface scarred.—The species is very near *N. thinophila* Johnst. from which it differs by its small delicate habit, usually simple glabrous not vesiculose stem and smaller leaves (to 14 mm. long), the margin lightly scarious, the 2 calyx lobes obtuse, the 2 nutlets smaller (author).

Arequipa: Lomas de Camaná, *Ferreyra 2535*, (type, Herb. San Marcos *15719*).

Nolana pallida Johnst. Contr. Gray Herb. 112: 69. 1936.

Minutely stellate-canescent prostrate shrub, the foliose rather rigid branchlets 2–15 cm. long, the internodes 2–12 mm. long; leaves strongly revolute, spatulate or oblanceolate, 6–20 mm. long, 2–3 (4) mm. wide, subfasciculately congested; pedicels 1–3, in fruit 5–9 mm. long and then more or less recurved; calyx 5 mm. long (in fruit 8 mm.), the tube 2 mm. thick, cuneate lobes 2–3 mm. long; corolla blue or violet-blue, about 1.5–2 cm. long, puberulent without, sparsely and minutely villosulous within as the linear filaments, the tube 1 mm. thick, 3 mm. long, the lobes subequaling the calyx; nutlets 5, uniseriate, broadly basally affixed, depressed and angulately globose, 2–2.7 mm. thick.—Simulates the very distinct *N. crassulifolia* Poepp. of Chile but differs from that and its allies in its blue (to violet?) instead of white corolla, unthickened and only sparsely pubescent filament bases; Raimondi specimen has leaves 3–6 mm. long, corolla about 1 cm. broad (author); from *N. revoluta* R. & P. of Camaná (cf. note before key) it may differ in duration, corolla shape and vegetatively, ex char. but perhaps not, allowing for errors in description.

Arequipa: Lomas, Port of Chala, *Weberbauer 7183*, type. Atico, *Raimondi 10971*. Southeast of Chala, *Worth & Morrison 15706*. Atiquipa, *Worth & Morrison 15640*.

Nolana pallidula Johnst. Contr. Gray Herb. 112: 31. 1936.

Suffruticose, glabrous, laxly decumbent-ascending, 1–1.5 dm. high, 1–1.5 meters broad, apparently annual; stems succulent, 3–6 mm. thick; internodes 1–6 cm. long; leaves spatulate or very narrowly oblanceolate, 1.5–4 cm. long, 2–6 mm. wide, abundantly and pallidly minutely papillate, broadly acute, attenuate into a scarious-margined petiole about 2 mm. wide, 2–9 mm. long; pedicels at anthesis 1.5–3 mm. long, ascending in fruit; corolla blue, 2–3 cm. long, about 18 mm. in diameter, the tube 5–6 mm. across, villous within,

the filaments 5–7 mm. long, sparsely villous; calyx rather succulent, about 18 mm. long, 6 mm. across, 5-costate, bifid toward middle, the 5 unequal erect lobes 4–6 mm. long, in fruit soon disrupted; nutlets 10–20, black, lustrous, angled, rugulose, the larger 4–5 mm. long, the smaller affixed between them; receptacle about 10-dentate, the pyramidal gynobase about 3 mm. high.—A loosely branched sprawling very succulent herb, evidently related to *N. latipes* Johnst. but much more spreading, fleshy, the narrower leaves with expanded scarious-margined bases, the scarious-margined calyx lobes erect, and the calyx not cleft as in *N. latipes* (author).

Tacna: Near Tacna, *Werdermann 728*, type; *Woitschach.*

Nolana Pearcei Johnst. Contr. Gray Herb. 112: 58. 1936.

Erect sparsely villous and obscurely glandular annual herb 2–3 dm. tall, the few ascending branches conspicuously foliose above and shortly branched; leaves compressed, elliptic or narrowly lanceolate, 1–2 cm. long, 3–6 mm. wide, acute, below the middle gradually or abruptly attenuate into a petiole 6–10 mm. long, scarcely revolute; pedicels about 1 mm. long; calyx 6–8 mm. long, the tube cupulate, 2–3 mm. broad, 1.5–2.5 mm. deep, the very unequal lobes linear or cuneate, unknown in fruit; corolla 2–2.5 cm. long, sparsely puberulent without, the tube subequaling the calyx lobe; stamens unequal, glabrous; fruit unknown.—Type consists only of upper part of plant but obviously a very distinct species (author).

Tacna: (*Pearce*, type, Kew).

Nolana pilosa Johnst. Contr. Gray Herb. 112: 79. 1936.

Laxly prostrate, suffrutescent but flowering the first year, the persisting stems finally about a meter long, to 3 mm. thick, early sparsely to densely glandular pilose with simple flexuose trichomes 1–2 mm. long; internodes mostly several (–6) cm. long; leaves strongly compressed revolute, usually oblanceolate, obtuse or rounded at tip, gradually attenuate to a slender petiole, 1–2.7 cm. long, 1–6 (–8) mm. wide; pedicels at anthesis 5–15 mm. long, recurved and stouter in fruit but little longer; calyx at anthesis 6–8 mm. long, the tube cupulate; lobes erect, unequal, cuneate, 4–6 mm. long; corolla blue, 13–22 mm. long, the tube included, minutely puberulent within, the limb 12–22 mm. across; stamens 5–8 mm. long; nutlets 4–8, uniseriate, depressed globose, rugulose, angulate, 2–2.5 mm. thick.—Distinctly coarser than *N. confinis* Johnst., having larger broader leaves and corollas and less entangled trichomes, the pilosity typically more

or less spreading, in xerophytes dense and appressed as in *Weberbauer 1556, Guenther & Buchtien 118* (author).

Arequipa: In gravel, lower edge lomas, Mollendo, *Weberbauer 1485; 1556;* (*Stafford K65*). Mejía, (*Guenther & Buchtien 117*, type, Hamburg; *119*). Cachendo, (*Guenther & Buchtien 118; 122*). South of Mollendo, *Worth & Morrison 15734.*

Nolana platyphylla Johnst. Contr. Gray Herb. 112: 60. 1936. *Bargemontia platyphylla* Johnst. l.c. 85: 175. 1929.

A more or less villous annual, 1–1.5 dm. tall, usually branched at base, the several elongate branches simple or sparsely branched, the internodes 2–6 cm. long; leaves lanceolate-ovate, the medial 2–2.5 cm. long, 7–10 mm. wide, contracted at base in a frequently margined petiole 5–10 mm. long, acute, the upper gradually reduced; pedicels solitary, 2–10 (–15) mm. long, slightly stouter and deflexed in fruit; calyx 8–10 mm. long, the cupulate tube 2–3 mm. long and wide, in fruit 5–8 mm. wide, the unequal erect lanceolate acuminate lobes about 7 mm. long; corolla blue, about 1 cm. long, the lobes scarcely exceeding the calyx, the tube glabrous within; nutlets about 2 mm. long.—Related to *N. gracillima* Johnst. but except for an evident hybrid plant abundantly distinct; it is coarser, much less branched, pedicels stouter, calyx larger and coarser, the 5–10 nutlets erect, obovoid, basally affixed to a low convex gynobase, uniseriate, subequal (author).

Moquegua: Southeast of Moquegua, 1,500 meters, *Weberbauer 7455*, type.

Nolana plicata Johnst. Contr. Gray Herb. 85: 174. 1929; 55.

Spreading, suffrutescent, densely and shortly glandular villous, the herbaceous branches to 4 mm. thick, the internodes 2–4 cm. long, the ascending branchlets to 1 dm. long, 1–1.5 mm. thick; leaves lanceolate or narrowly ovate, gradually attenuate to winged petiole 6–10 mm. long, acute, 7–15 mm. long, 2–3 mm. wide, obscurely pinnate-nerved, narrowly revolute; pedicels solitary, 1–2 cm. long, early erect, reflexed in fruit; calyx about 1.5 cm. long, campanulate; corolla about 3 cm. long, sparsely villous, densely so within; filaments unequal, affixed above the base; fruit about 1 cm. in diameter, the 3–5 brown nutlets strongly convex and rugose dorsally, carinate toward apex, ventrally subplane, not rarely angled and with a large whitish cicatrix.—Calyx conspicuously plicate in each sinus, the sharply triangular lobes not half the entire length of calyx, this lanceolate-ovate

in outline, being broadest just above the rounded base then gradually contracted toward apex formed by the connivent lobes; species probably most closely related to *N. coronata* R. & P., a glabrate plant with broader leaves more abruptly contracted into the petiole (author).

Arequipa: Atiquipa, *Weberbauer 7190*, type.

Nolana polymorpha Gaud. Bot. Voy. Bonite, Atlas *pl. 101*. 1851–52; 56.

Shrubby with many tight buds on the old wood; calyx pubescent, the subequal spreading segments minutely 2–4-denticulate; corolla with large (2.5–4 cm. wide) open throat; nutlets 5, broadly ellipsoid, strongly carinate, the small attachment obliquely basal.—After Johnston (from plate), who has discussed, l.c. 12, probable dates of Gaudichaud's Atlas. A Gaudichaud specimen at Paris labeled simply Peru, with an unpublished name in reference to the bilabiate calyx, has ovate-elliptic leaves about 1.5–2 cm. long, 5–8 mm. wide, attenuate to petioles 5–10 mm. long, calyx nearly glabrous, about 1 cm. long, corolla 2 cm. across at apex, but characters doubtful as material poor. Lazella Schwarten, Librarian, Harvard University Herbarium, kindly sent me a tracing of the plate which shows flower and parts "enlarged"; if twice natural size corolla is about 2 cm. wide, 4 cm. long, calyx 10–12 mm. long, cleft about medially, shortly pubescent, one of the 2 spreading lobes slightly longer.

Peru (possibly). Chile?

Nolana scaposa Ferr. Publ. Hist. Nat. "Javier Prado" Bot. ser. B, no. 10: 5, *pl. 3*. 1955.

A densely pubescent annual, the conspicuously scapose stem 1–nearly 3 dm. high, the hirsute trichomes 1.5–3 mm. long; leaves spatulate, attenuate into petiole 14–22 mm. long, 1–1.8 mm. wide, apically subobtuse, 12–22 mm. long, 10–18 mm. wide, crowded at base of stem; flowering pedicels only 1–2 mm. long, the campanulate calyx 7–9 mm. long, 3.5–4.5 mm. across, the short tube with 5 ascending lobes, 2 larger, spatulate-elliptic, subobtuse, 6.5–7.5 mm. long, 1.4–2.2 mm. wide, 3 smaller, lanceolate, often acute, 4.8–6 mm. long, 1.2–1.8 mm. wide; corolla infundibuliform, violet, 16–21 mm. long, 7–9 mm. wide above, the lobes very obtuse, the tube lightly villous within; filaments linear, the 2 larger to 13 mm. long, the 3 smaller 10 or 11 mm. long; style 13–14 mm. long; nutlets (23 or 24) black, pyriform, prominently muricate, the 14 larger 0.9–1.2 mm. long, 0.8–1

mm. thick, the smaller 0.5–0.6 mm. long, 0.3–0.4 mm. broad.—Very distinct in habit, calyx and nutlets.

Arequipa: Lomas de Camaná, *Ferreyra 2538* (type, Herb. San Marcos *15720; Ferreyra 111699*).

Nolana spathulata R. & P. Fl. Peruv. 2: 7, *pl. 113a.* 1799; 29. *N. bipartita* R. & P. l.c.

Type an erect or suberect annual but probably persisting, the stems eventually branching, more or less densely glandular puberulent with crisped trichomes, these less developed on the cordate-ovate leaves and calyces; petioles 1–4 cm. long; leaves rounded-apiculate at apex, shortly decurrent at the more or less oblique and cordate base, the upper the larger and about 4 cm. wide, 4.5 cm. long, the pedicels nearly as long; calyx 2– nearly 3 cm. long, cleft laterally but the 5 subequal lobes apically spatulate or broadly ovate, 5–9 mm. long, often about 5 mm. wide, more or less contracted at base; corolla about 3.5–4 cm. long, widely expanded; stamens only moderately unequal.—Apparently develops 5 large nutlets, their faces partially attached to the receptacle, partially to each other, and 5 small nutlets, fitted wedge-like between the bases of the larger ones. Coastal, at lower edge of lomas; corolla light blue. F.M. Neg. 23244.

Arequipa: Pongo and Atiquipa, *Ruiz & Pavón* (*Tafalla*, type). Chala, (*Guenther & Buchtein 116; 120*, det. Bruns, *N. revoluta*); *Ferreyra 1386.* Mollendo, *Weberbauer 1500; Eyerdam 25153; 25154; Worth & Morrison 15735.* Camaná to Atiquipa, *Ferreyra 2560.*

Nolana spergularioides Ferr. Publ. Hist. Nat. "Javier Prado" Bot. ser. B, no. 10: 8, *pl. 5.* 1955.

Suffruticose, decumbent, lanuginose, or the branches, these 1–2 mm. thick, glabrescent; leaves sessile, linear, somewhat flexuose or recurved, slightly revolute, 1-nerved, acuminate both ends, 1–2 cm. long, about 1 mm. wide; flowers sessile, axillary, solitary; calyx campanulate, 8 or 9 mm. long, 3–3.5 mm. across, the tube 3.8–4 mm. long, the linear acuminate ascending lobes 4.2–5 mm. long, 0.8–1.2 mm. wide at base; corolla infundibuliform, blue, 13–15 mm. long, 8 or 9 mm. broad above, the lobes well-developed, rounded, unequal, strongly ciliolate, the tube villous within; filaments unequal, 7.8–9 mm. long; style 9 or 10 mm. long; nutlets usually 2, rarely 3, subspherical, black, somewhat lustrous, 2.5–3 mm. thick, the smaller to 1.8 mm. thick.—Allied to *N. gracillima* Johnst. of Moquegua but distinguished by its perennial habit and gray-lanuginose indument,

the flowers sessile, the calyx larger; less similar to *N. pilosa* Johnst. and *N. pallida* Johnst. (author).

Arequipa: Lomas de Camaná, *Rauh 558* (type, Herb. San Marcos *15722*).

Nolana thinophila Johnst. Contr. Gray Herb. 112: 56. 1936.

Procumbent, laxly branched, the younger branchlets succulent, all obscurely glandular and more or less glutinous; stems suffruticose, 1.5–3 mm. thick; internodes 1–5 cm. long; leaves spatulate, 1–3 cm. long, 1.5–3 mm. wide, rounded or obtuse at apex, gradually attenuate to base; pedicels 6–15 mm. long, recurved in fruit; corolla blue, 1.5–2 cm. long, the tube longer than the calyx, sparsely villous within; filaments unequal; calyx 6–7 (8) mm. long, cleft but not at all dentate, the cylindric tube 2–3 mm. thick, 4–5 mm. in fruit when disrupted by the more or less unequal nutlets, these often 5, erect, black, elongate, 3–5 mm. long, 2–2.5 mm. thick, rounded dorsally, the face occupied by a large scar; receptacle 10–15-dentate, the gynobase only 0.5 mm. high, about 2 mm. broad.—Notable in calyx and nutlet characters (author); in recent collections the main stems seem to be lignescent.

Arequipa: Sandy sea-beach, Mollendo, *Pennell 14280*, type; (*Stafford 55*); *Eyerdam 25171; Worth & Morrison 15726*. Mejia, (*Guenther & Buchtien 121*).

Nolana tomentella Ferr. Publ. Hist. Nat. "Javier Prado" Bot. ser. B, no. 10: 10, *pl. 7*. 1955.

Suffruticose, tomentose including the calyces, the branches 3–5 mm. thick; leaves sessile, spatulate, attenuate to base, narrowly revolute, 1.5–5 cm. long, 4–16 mm. wide; pedicels 13–20 mm. long; calyx campanulate, bifid, 10–14 mm. long, 6 or 7 mm. across, the triangular acute lobes 4.5–7 mm. long, 3.5–4 mm. wide; corolla infundibuliform, blue, 18–22 mm. long, 14–16 mm. across above, obscurely irregularly and obtusely lobulate, the short tube densely pubescent without, villous within; filaments unequal, the 2 larger 11–13 mm. long, the others 10 or 11 mm. long; style about 9 mm. long; nutlets 10 or 11, biseriate, reniform, the larger 1.5–2 mm. long, about 1 mm. thick, the smaller 0.7–1 mm. long, about half as thick. —Similar to *N. plicata* Johnst. from which it differs by the dense tomentosity, the spatulate leaves, and the bilobed densely tomentose campanulate calyx (author). The scarcely discernible lobulation is marked by a notch-like indentation.

Arequipa: Lomas de Jahuay, Nazca to Chala, *Ferreyra 8806* (type, Herb. San Marcos *15724*).

Nolana Tovariana Ferr. Publ. Hist. Nat. "Javier Prado" Bot. ser. B, no. 10: 14, *pl. 10*. 1955.

Conspicuously lanate, suffruticose, the approximate decumbent branches 1–2.4 mm. thick; leaves sessile, linear or shortly spatulate, acute or rarely obtuse, 8–16 mm. long, 1–2 mm. wide; pedicels ascending, 5–22 mm. long; calyx more or less fusiform, 9–11 mm. long, 2.2–3.2 mm. thick, the tube 4.5–6 mm. long, the lobes 4.5–5.5 mm. long, 1.2–1.4 mm. wide, long-acuminate, ascending, more or less connate, densely villous without; corolla infundibuliform, blue, at least 2 cm. long, 15–17 mm. broad above, rather notably lobulate, the lobes rounded, lightly pubescent without, the tube villous within; filaments unequal, 12 or 13 and 14 or 15 mm. long; style 11–13 mm. long; nutlets 5, uniseriate, reniform, black, about 1 mm. long, and half as thick, but immature.—At first sight this suggests a relationship to *N. thinophila* Johnst. but is distinguished by its conspicuous lanosity, the leaves neither fleshy nor glandular and the calyx fusiform; it is less related to *N. pallida* Johnst.; dedicated to Dr. Oscar Tovar Serpa, able collaborator of the Department of Botany, Museum of Natural History, Lima.

Arequipa: Lomas between Camaná and Ocona, *Ferreyra 8861* (type, Herb. San Marcos *15727*); *8865; 8883*.

Nolana urubambae Vargas, Revista Univ. Cuzco 43, no. 107: 154, *pl. 4*. 1955.

Root napiform, 8–12 cm. long; stem lignescent, toward base papyraceous-exfoliating, little branched, 1–1.5 dm. long, prostrate, sparsely pilose, the older branches densely pilose toward apex and blue-colored; leaves somewhat fleshy, oblanceolate, petiolate, the petiole 2–4 mm. long, the blade 5–12 mm. long, 1.5–4.5 mm. wide, glabrous; calyx at anthesis 6 mm. long, subtomentose, the broadly lanceolate lobes finally coriaceous; pedicels to 4 mm. long; corolla light blue with darker blue lines, slightly infundibuliform or scarcely longer than calyx; stamens unequal, 6–8 mm. long, dull blue as the scarcely subglobose exserted stigma; style exserted; uniseriate nutlets 3–5, 2–3.5 mm. long, black, scabrous, angulate —Possibly related to *N. confinis* Johnst. of Tacna but differing in form and shape of the alternate or subopposite leaves.

Cuzco: Yahuarmaqui, Prov. Urubamba, 2,860 meters, (*Vargas 7864*, type).

Nolana Weberbaueri [Bitter] Johnst. Contr. Gray Herb. 112: 58. 1936.

Erect annual 1–2 dm. tall, the inconspicuous trichomes mostly glanduliferous, the fistulose stems 2–3 mm. thick, the upper laxly and dichotomously branched; internodes 1–3 cm. long; leaves somewhat succulent, pale, ovate, obtuse, 7–15 mm. long, 4–10 mm. wide, abruptly contracted at rounded or obtuse base into petiole 0.5–2 cm. long; pedicels at anthesis very slender, erect, about 4 mm. long, abruptly deflexed at base in fruit and 2–3 times longer; calyx 4–5 mm. long, deeply lobed, the tube about 2 mm. in diameter, the lobes linear or cuneate, unequal; corolla reddish-violet, 15–18 mm. long, minutely and sparsely puberulent, the tube 2–3 mm. long, minutely villous within; filaments glabrous, unequal; nutlets 4–6, black, strongly tuberculate-rugose, depressed globose, 2–3 mm. in diameter.—Obviously allied to *N. laxa* (Miers) Johnst. (author); the name was given in herbaria by Bitter.

Ica: Huauyanga to Pampano, 1,000 meters, *Weberbauer 5385*, type.

Nolana Weissiana Ferr. Publ. Hist. Nat. "Javier Prado" Bot. ser. B, no. 10: 9, *pl. 6*. 1955.

Suffrutescent, erect, the ascending branches densely pubescent, 1–1.5 dm. long, 1.2–2.5 mm. thick; petioles 6–8 mm. long; leaves broadly spatulate, obtuse, 2–4 cm. long, 1–2 cm. wide, very lanuginose beneath as the pedicels and calyces, the former 2–7 mm. long, the latter 9–11 mm. long, 5–6.5 mm. across, the triangular ascending lobes acute, 3.5–6 mm. long, 2.2–4 mm. wide at base; corolla infundibuliform, blue, 19–22 mm. long, 16–18 mm. broad, obscurely merely scalloped, the tube densely villous within; stamens unequal, 2 obviously longer, the filaments 8.5–11 mm. long, linear, compressed, sparsely villous toward base; nutlets 9 or 10, the larger 5 reniform, 0.8–1 mm. long, 0.5–0.6 mm. thick, the 4 or 5 smaller ovoid, to 0.5 thick but immature.—Allied by the author to *N. spathulata* R. & P. but suffruticose, strongly lanuginose, calyx lobes triangular, much shorter pedicels, and 9 or 10 nutlets; also comparable to *N. coronata* R. & P. but separated by the indument, obtuse leaves and smaller calyx. Dedicated to Professor Pedro Weiss, internationally known for his scientific investigations in human pathology.

Arequipa: Lomas de Chaparra, near Chala, *Ferreyra 7232*, (type, Herb. San Marcos *15723*).

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